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# Industrial Source Complex (ISC) Dispersion Model User's Guide. Second Edition Volume 2. Appendices (Revised)

TRC Environmental Consultants, Inc.
East Hartford, CT

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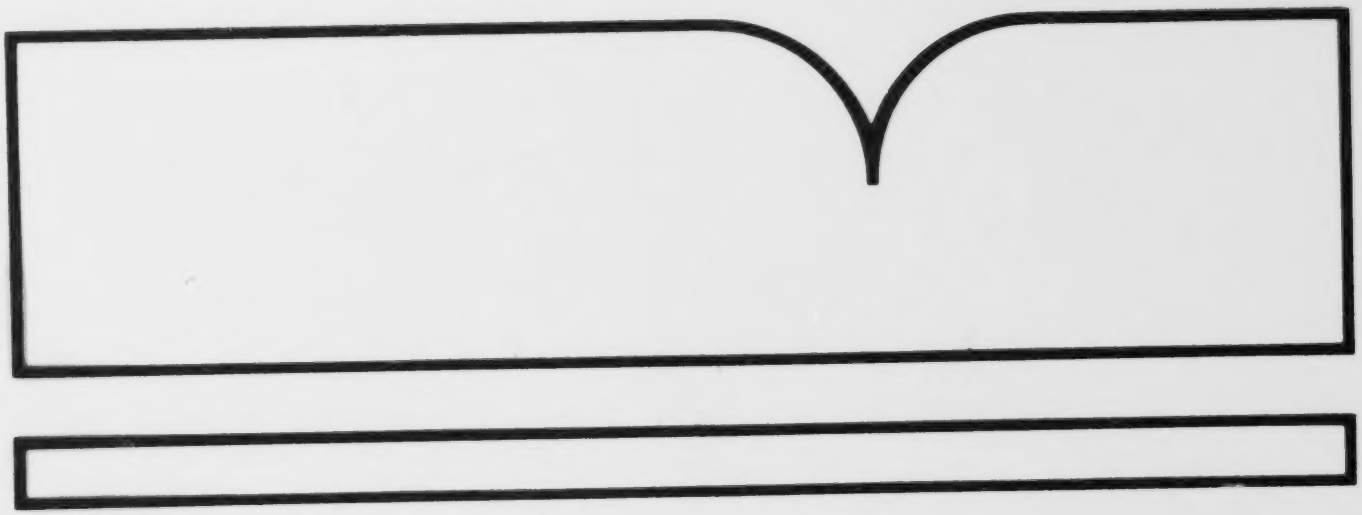

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# Industrial Source Complex (ISC) Dispersion Model User's Guide — Second Edition (Revised)

# Volume II. Appendices

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16. ABSTRACT

The Second Edition (Revised) of the Industrial Source Complex Dispersion (ISC) Model User's Guide provides a detailed technical discussion of the updated ISC Model. The ISC Model was designed in response to the need for a comprehensive set of dispersion model computer programs that could be used to evaluate the air quality impact of emissions from large industrial source complexes. Air quality impact analyses for industrial source complexes often require consideration of factors such as fugitive emissions, aerodynamic building wake effects, time-dependent exponential decay of pollutants, gravitational settling, and dry deposition. The ISC Model consists of two computer programs that are designed to consider these and other factors so as to meet the dispersion modeling needs of air pollution control agencies and others responsible for performing dispersion modeling analyses. Major features in the revised model code include: (1) a regulatory default option which incorporates regulatory guidance contained in the Guideline on Air Quality Models as revised in 1986; (2) a calms processing procedure; (3) a new Urban Mode 3 which utilizes urban dispersion parameters published by Briggs based on observations of McElroy and Pooler in St. Louis; and (4) revised sets of wind speed profile exponents for rural and urban scenarios. The model code now contains additional featurs for handling "flagpole" receptors and a refined treatment of building wake effects including the use of building dimensions as a function of wind direction.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
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# Industrial Source Complex (ISC) Dispersion Model User's Guide–Second Edition (Revised)

## Volume II. Appendices

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

December 1987

## DISCLAIMER

This report has been reviewed by the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use.

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# APPENDIX A

# COMPLETE FORTRAN LISTING OF THE

# INDUSTRIAL SOURCE COMPLEX

# SHORT TERM MODEL (ISCST)

# COMPUTER PROGRAM

```
C                  ISCST (DATED 87338)                                    ISC00010
C                  AN AIR QUALITY DISPERSION MODEL IN                     ISC00020
C                  SECTION 1.  GUIDELINE MODELS                           ISC00030
C                  IN UNAMAP (VERSION 6) JAN. 88.                         ISC00040
C                  SOURCE:  FILE 6 ON UNAMAP MAGNETIC TAPE FROM NTIS.     ISC00050
C     THIS VERSION OF ISCST WAS PREPARED IN 1987                          ISC00060
C     BY TRC ENVIRONMENTAL CONSULTANTS INC. FROM THE                      ISC00070
C     VERSION CONTAINED IN UNAMAP VERSION 6.                              ISC00080
C     THE FOLLOWING FEATURES HAVE BEEN ADDED:                             ISC00090
C        OPTION FOR BRIGGS URBAN DISPERSION COEFFICIENTS                  ISC00100
C        ISW(20)=3.                                                       ISC00110
C        A PLUME RISE FORMULATION THAT IS                                 ISC00120
C        CONSISTENT WITH THE MPTER MODEL.                                 ISC00130
C        OPTION FOR BUOYANCY INDUCED DISPERSION, ISW(26).                 ISC00140
C        THE MINIMUM SOURCE-RECEPTOR DISTANCE HAS                         ISC00150
C        BEEN REDUCED FROM 100M TO 1M.                                    ISC00160
C        OPTION FOR CALM WIND TREATMENT OF NWS                            ISC00170
C        METEOROLOGICAL DATA, ISW(27).                                    ISC00180
C        REVISIONS THROUGH H.E. CRAMER CO.'S                              ISC00190
C        UPDATE PACKAGES HAVE BEEN INCLUDED.                              ISC00200
C        POLLUTANT INDICATOR OPTION, ISW(29).                             ISC00210
C        A TERRAIN TRUNCATION ALOGORITHM HAS BEEN ADDED.                  ISC00220
C        AN OPTION TO PRINT INPUT DATA AS SOON AS IT IS                   ISC00230
C        INPUT HAS BEEN ADDED,ISW(30).                                    ISC00240
C        A "REGULATORY DEFAULT OPTION" SWITCH, ISW(28).                   ISC00250
C        DEFAULT WIND PROFILE COEFFICIENTS FOR                            ISC00260
C        RURAL AND URBAN OPTIONS, ISW(21).                                ISC00270
C        DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS ARE             ISC00280
C        ASSIGNED IF DEFAULT OPTION CHOSEN.                               ISC00290
C        RECEPTORS BELOW PLANT GRADE ARE TREATED IN                       ISC00300
C        THE SAME MANNER AS RECEPTORS ABOVE                               ISC00310
C        PLANT GRADE.                                                     ISC00320
C        CALCULATIONS FOR NEGATIVE DEPOSITION                             ISC00330
C        HAVE BEEN SET TO ZERO(S0307340-2).                               ISC00340
C        ABOVE GROUND (FLAGPOLE) RECEPTORS MAY NOW BE MODELLED.           ISC00350
C        DIRECTION SPECIFIC BUILDING DOWNWASH WITH A LINEAR DECAY         ISC00360
C        ADJUSTMENT TO PLUME HEIGHT AND AN ADJUSTMENT TO PLUME            ISC00370
C        RISE ARE NOW PERFORMED FOR REGULATORY USE.                       ISC00380
C     THESE FEATURES ARE DESCRIBED IN MORE DETAIL                         ISC00390
C     UNDER "CARD GROUP 2" BELOW.                                         ISC00400
C******       INDUSTRIAL SOURCE COMPLEX SHORT TERM MODEL          *******ISC00410
C         WRITTEN BY CRAIG S. CHENEY, H. E. CRAMER CO., INC.              ISC00420
C                                                                         ISC00430
C        THIS PROGRAM IS DESIGNED TO CALCULATE GROUND-LEVEL OR ELEVATEDISC00440
C     CONCENTRATIONS OR DEPOSITIONS FROM STACK, VOLUME OR AREA SOURCES.  ISC00450
C     THE RECEPTORS AT WHICH THE CONCENTRATION OR DEPOSITION ARE         ISC00460
C     CALCULATED MAY BE DEFINED ON A X,Y RIGHT-HANDED CARTESIAN          ISC00470
C     COORDINATE SYSTEM GRID OR A POLAR COORDINATE SYSTEM GRID.  THE     ISC00480
C     POLAR COORDINATE SYSTEM DEFINES 360 DEGREES AS NORTH (POSITIVE     ISC00490
C     Y-AXIS), 90 DEGREES AS EAST (POSITIVE X-AXIS), 180 DEGREES AS      ISC00500
C     SOUTH AND 270 DEGREES AS WEST.  WIND DIRECTIONS ARE ALSO DEFINED   ISC00510
C     IN THIS MANNER.  DISCRETE OR ARBITRARILY PLACED RECEPTORS MAY BE   ISC00520
```

```
C     DEFINED USING EITHER COORDINATE SYSTEM.  FINALLY, SOURCE LOCATIONSISC00530
C     MUST BE REFERENCED WITH THE CARTESIAN COORDINATE SYSTEM.          ISC00540
C                                                                       ISC00550
C         AVERAGE CONCENTRATION OR TOTAL DEPOSITION MAY BE CALCULATED   ISC00560
C     IN 1-, 2-, 3-, 4-, 6-, 8-, 12-  AND/OR 24-HOUR TIME              ISC00570
C     PERIODS.  AN 'N'-DAY AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)  ISC00580
C     OR AN AVERAGE CONCENTRATION (OR TOTAL DEPOSITION) OVER THE TOTAL  ISC00590
C     NUMBER OF HOURS MAY ALSO BE COMPUTED.                             ISC00600
C     CONCENTPATIONS (DEPOSITIONS) MAY BE COMPUTED FOR ALL SOURCES OR   ISC00610
C     FOR ANY COMBINATION OF SOURCES THE USER DESIRES.                  ISC00620
C     OTHER OPTIONS INCLUDE INPUT OF TERRAIN HEIGHTS FOR RECEPTORS,     ISC00630
C     TABLES OF HIGHEST AND SECOND HIGHEST CONCENTRATIONS OR            ISC00640
C     DEPOSITIONS AT EACH RECEPTOR, TABLES OF THE FIFTY MAXIMUM VALUES  ISC00650
C     CALCULATED AND TAPE OUTPUT.  REFER TO SECTION 3 OF THE USER'S     ISC00660
C     MANUAL FOR A MORE DETAILED EXPLANATION OF THE ABOVE OPTIONS.      ISC00670
C                                                                       ISC00680
C         THIS PROGRAM IS WRITTEN IN FORTRAN 77 AND ASSUMES A WORD      ISC00690
C     LENGTH OF 32 BITS OR MORE SINCE 4 ALPHANUMERIC CHARACTERS ARE     ISC00700
C     EXPECTED TO BE STORED INTO ONE WORD.  THE BASIC PROGRAM REQUIRES  ISC00710
C     ABOUT 26500 WORDS OF STORAGE.  THIS PROGRAM HAS CURRENTLY LIMITED ISC00720
C     DATA STORAGE TO 43500 WORDS FOR A TOTAL OF 70000 WORDS.           ISC00730
C                                                                       ISC00740
C     THE MAIN ROUTINE OF THIS PROGRAM DYNAMICALLY ALLOCATES STORAGE    ISC00750
C     TO THE CALCULATING SUBROUTINE, MODEL.  MAXIMUM LIMITS ARE NOT     ISC00760
C     LIMITED INDIVIDUALLY TO THE NUMBER OF SOURCES(NSOURC) OR THE      ISC00770
C     NUMBER OF RECEPTORS(NXPNTS*NYPNTS + NDGYPT = NPNTS) OR THE        ISC00780
C     NUMBER OF TIME PERIODS TO BE CALCULATED (NAVG) OR THE NUMBER OF   ISC00790
C     SOURCE GROUPS DESIRED (NGROUP).  INSTEAD THE MAXIMUM LIMIT IS A   ISC00800
C     FUNCTION OF ALL FOUR VARIABLES.  THIS MAXIMUM LIMIT CAN BE        ISC00810
C     COMPUTED WITH THE FOLLOWING EQUATION.                             ISC00820
C                                                                       ISC00830
C     LIMIT = NPNTS*(2+NAVG*NGROUP) + NXPNTS + NYPNTS + 2*NDGYPT        ISC00840
C             + 287*NSOURC + A + B + C                                  ISC00850
C                                                                       ISC00860
C     WHERE A = NPNTS*NGROUP IF ISW(15) = 1; OTHERWISE A = 0 AND        ISC00870
C           B=4*NAVG*NPNTS*NGROUP IF ISW(17) =1 OR                      ISC00880
C           B=6*NAVG*NPNTS*NGROUP IF ISW(17) =2: OTHERWISE B =0 AND     ISC00890
C           C = 201*NAVG*NGROUP IF ISW(18) = 1; OTHERWISE C = 0.        ISC00900
C     ALSO IF NGROUP = 0, ASSUME NGROUP = 1 FOR THE ABOVE EQUATION.     ISC00910
C                                                                       ISC00920
C     THIS LIMIT MUST NOT EXCEED THE VALUE BY WHICH THE 'QF' ARRAY      ISC00930
C     IS DIMENSIONED AND BY WHICH THE VARIABLE, 'LIMIT', IS SET IN      ISC00940
C     THE MAIN ROUTINE.                                                 ISC00950
C                                                                       ISC00960
C     THE AMOUNT OF TIME A PROBLEM RUN TAKES TO EXECUTE CAN BE DESCRIBEDISC00970
C     BY THE FOLLOWING EQUATION.                                        ISC00980
C                                                                       ISC00990
C     # OF MINUTES = CONSTANT*(NDAYS+1)*(1+NHOURS*(1+0.8*NSOURC         ISC01000
C                  *(1+0.6*NPNTS+0.1*NGROUP*NAVG)))                     ISC01010
C                                                                       ISC01020
C     WHERE CONSTANT = 2.1*10**-5.  THIS VALUE IS DERIVED FROM RUNS     ISC01030
C                      MADE ON A UNIVAC 1108 AND WILL VARY FOR OTHER    ISC01040
C                      COMPUTERS.                                       ISC01050
C           NAVG = SUM OF PARAMETERS ISW(7) TO ISW(14) SET TO 1.        ISC01060
C           NPNTS = TOTAL NUMBER OF RECEPTOR POINTS.                    ISC01070
C     ALL OTHER PARAMETERS ARE DEFINED IN INPUT DATA BELOW.             ISC01080
C                                                                       ISC01090
```

```
C                                                                       ISC01100
C***************************** INPUT DATA ******************************ISC01110
C                                                                       ISC01120
C     THE INPUT DATA IS PARTITIONED INTO SEVEN MAJOR CARD GROUPS WHERE  ISC01130
C     EACH CARD GROUP CONTAINS COMMON INPUT PARAMETERS.  FOR EXAMPLE,   ISC01140
C     CARD GROUP 6 CONTAINS ALL SOURCE DATA PARAMETERS.  A CARD GROUP   ISC01150
C     MAY BE DIVIDED INTO 'CARDS'.  A 'CARD' MAY ACTUALLY CONSIST OF    ISC01160
C     MORE THAN ONE CARD IMAGE.  A 'CARD' OR COMPLETE CARD GROUPS MAY   ISC01170
C     NOT BE READ BY THE PROGRAM DEPENDING ON THE PROGRAM OPTIONS       ISC01180
C     CHOSEN BY THE USER.                                               ISC01190
C                                                                       ISC01200
C                                                                       ISC01210
C*****CARD GROUP 1                                                      ISC01220
C                                                                       ISC01230
C*CARD 1  FORMAT(15A4)                                                  ISC01240
C                                                                       ISC01250
C     TITLE - A 60 CHARACTER INFORMATION HEADING WHICH WILL APPEAR AT   ISC01260
C             THE TOP OF EACH PAGE OF OUTPUT.                           ISC01270
C                                                                       ISC01280
C*****CARD GROUP 2                                                      ISC01290
C                                                                       ISC01300
C*CARD 1  FORMAT(40I2)                                                  ISC01310
C                                                                       ISC01320
C     ISW(1) - =1, CALCULATE CONCENTRATION,                             ISC01330
C              =2, CALCULATE DEPOSITION.                                ISC01340
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01350
C     ISW(2) - =1, RECTANGULAR CARTESIAN COORDINATE RECEPTOR GRID       ISC01360
C                  SYSTEM IS ASSUMED.                                   ISC01370
C              =2, POLAR COORDINATE RECEPTOR GRID SYSTEM IS ASSUMED.    ISC01380
C              =3, GENERATE RECTANGULAR CARTESIAN COORDINATE GRID       ISC01390
C              SYSTEM.  GRIDX(1) IS THE STARTING POINT OF THE X-AXIS    ISC01400
C              AND GRIDX(2) IS THE INCREMENTAL VALUE USED IN GENERATING ISC01410
C              THE X-AXIS.  THE Y-AXIS IS GENERATED IN A LIKE MANNER    ISC01420
C              USING GRIDY(1) AND GRIDY(2).                             ISC01430
C              =4, GENERATE POLAR COORDINATE SYSTEM RADIALS.            ISC01440
C              GRIDY(1) IS THE STARTING RADIAL (IN INTEGER DEGREES) AND ISC01450
C              GRIDY(2) IS THE INCREMENTAL INTEGER VALUE USED TO        ISC01460
C              GENERATE THE REMAINING RADIALS.  THE VALUES GENERATED    ISC01470
C              MUST BE WITHIN THE RANGE OF 1 TO 360 DEGREES.            ISC01480
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01490
C     ISW(3) - =1, DISCRETE RECEPTOR POINTS ARE REFERENCED WITH THE     ISC01500
C                  CARTESIAN COORDINATE SYSTEM.                         ISC01510
C              =2, DISCRETE RECEPTOR POINTS ARE REFERENCED WITH THE     ISC01520
C                  POLAR COORDINATE SYSTEM.                             ISC01530
C              IF 0 OR BLANK, 1 IS ASSUMED.                             ISC01540
C     ISW(4) - =0, NO RECEPTOR TERRAIN ELEVATIONS ARE READ.             ISC01550
C              =1, RECEPTOR TERRAIN ELEVATIONS ARE READ. IF = -1, THEN  ISC01560
C                  ELEVATIONS ARE IN METERS RATHER THAN FEET.           ISC01570
C     ISW(5) - =0, NO CONCENTRATIONS OR DEPOSITIONS ARE WRITTEN TO TAPE. ISC01580
C              =1, CONCENTRATIONS (DEPOSITIONS) ARE WRITTEN TO TAPE     ISC01590
C              WITH LOGICAL UNIT NUMBER ITAP.  CONCENTRATIONS           ISC01600
C              (DEPOSITIONS) ARE WRITTEN TO TAPE IN THE TIME PERIODS    ISC01610
C              INDICATED BY ISW(7)-ISW(14).  ALSO, AN ANNUAL AVERAGE    ISC01620
C              CONCENTRATION OR TOTAL DEPOSITION IS WRITTEN TO TAPE IF  ISC01630
C              ISW(15) IS SET.  TWO END OF FILE MARKS ARE WRITTEN AT    ISC01640
C              THE END OF THE TAPE.  CONSULT SECTION 3.2.4 OF THE USER'SISC01650
C              MANUAL FOR A DETAILED DISCUSSION OF THIS OPTION.         ISC01660
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C     ISW(6) - =0, NO INPUT DATA ARE LISTED.                                ISC01670
C              =1, LIST ALL INPUT DATA.                                     ISC01680
C              =2, LIST ALL INPUT DATA PLUS METEOROLOGICAL DATA.            ISC01690
C     ISW(7) - =1, CALCULATE 1-HOUR TIME PERIODS.                           ISC01700
C     ISW(8) - =1, CALCULATE 2-HOUR TIME PERIODS.                           ISC01710
C     ISW(9) - =1, CALCULATE 3-HOUR TIME PERIODS.                           ISC01720
C     ISW(10) - =1, CALCULATE 4-HOUR TIME PERIODS.                          ISC01730
C     ISW(11) - =1, CALCULATE 6-HOUR TIME PERIODS.                          ISC01740
C     ISW(12) - =1, CALCULATE 8-HOUR TIME PERIODS.                          ISC01750
C     ISW(13) - =1, CALCULATE 12-HOUR TIME PERIODS.                         ISC01760
C     ISW(14) - =1, CALCULATE 24-HOUR TIME PERIODS.                         ISC01770
C     ISW(15) - =1, PRINT AN 'N'-DAY AVERAGE CONCENTRATION OR TOTAL         ISC01 80
C               DEPOSITION TABLE FOR ALL RECEPTORS AND FOR EACH SOURCE      ISC01790
C               GROUP.                                                      ISC01800
C     ISW(16) - =1, PRINT DAILY TABLES WHOSE TIME PERIODS ARE               ISC01810
C               INDICATED BY ISW(7)-ISW(14) FOR EACH RECEPTOR FOR EACH      ISC01820
C               DAY OF METEOROLOGICAL DATA AND FOR EACH SOURCE GROUP.       ISC01830
C     ISW(17) - =1, PRINT TABLES OF HIGHEST AND SECOND HIGHEST              ISC01840
C               CONCENTRATIONS(DEPOSITIONS) FOR EACH RECEPTOR.  A           ISC01850
C               SET OF THESE TABLES IS PRINTED FOR EACH TIME PERIOD         ISC01860
C               INDICATED BY ISW(7)-ISW(14) AND FOR EACH SOURCE GROUP.      ISC01870
C               IF = 2, A THIRD HIGHEST TABLE IS ALSO PRINTED.              ISC01880
C     ISW(18) - PRINT THE MAXIMUM 50 CONCENTRATIONS (DEPOSITIONS)           ISC01890
C               FOR EACH TIME PERIOD SPECIFIED BY ISW(7)-ISW(14) AND        ISC01900
C               FOR EACH SOURCE GROUP.                                      ISC01910
C     ISW(19) - =1, PRE-PROCESSED METEOROLOGICAL DATA IS READ ON            ISC01920
C               LOGICAL UNIT IMET.                                          ISC01930
C               =2, METEOROLOGICAL DATA ARE EXPECTED ON CARDS ( NOT         ISC01940
C                   ALLOWED IF REGULATORY DEFAULT OPTION CHOSEN)            ISC01950
C               IF 0 OR BLANK, 1 IS ASSUMED.                                ISC01960
C     ISW(20) - =0, USE RURAL MODE OPTION.                                  ISC01970
C               =1, USE URBAN MODE 1 OPTION.                                ISC01980
C               =2, USE URBAN MODE 2 OPTION.                                ISC01990
C               =3, USE URBAN MODE 3 OPTION-MCELROY-POOLER                  ISC02000
C               NOTE:  IF ISW(19) = 2, THE RURAL MODE OPTION IS USED.       ISC02010
C                      UNLESS ISW(20)=3                                     ISC02020
C     ISW(21) - =1, THE PROGRAM PROVIDES DEFAULT VALUES FOR THE WIND        ISC02030
C                   PROFILE EXPONENTS.  THESE VALUES ARE .15,.15,.2,.25,    ISC02040
C                  .3,.3 FOR URBAN  AND .07,.07,.1,.15,.35,.55              ISC02050
C                  FOR RURAL FOR EACH OF THE SIX STABILITY                  ISC02060
C                  AND FOR ALL THE WIND SPEED CATEGORIES.                   ISC02070
C                 =2, ENTER WIND PROFILE EXPONENTS IN CARD GROUP 5, CARDS   ISC02080
C                     1-6.  THESE VALUES ARE USED THROUGHOUT THE DATA       ISC02090
C                     CASE.  SEE CARD GROUP 5.                              ISC02100
C                 =3, THE PROGRAM READS ALL WIND PROFILE EXPONENTS ON AN     ISC02110
C                     HOUR-TO-HOUR BASIS IN CARD GROUP 7.  SEE CARD GROUP   ISC02120
C                     7.  NOTE THAT THIS OPTION IS APPLICABLE ONLY IF       ISC02130
C                     HOURLY METEOROLOGICAL DATA IS CARD INPUT (ISW(19)      ISC02140
C                     EQUALS 2).                                            ISC02150
C               DEFAULT VALUE EQUALS 1.                                     ISC02160
C     ISW(22) - =1, THE PROGRAM PROVIDES DEFAULT VALUES FOR THE VERTICAL    ISC02170
C                   POTENTIAL TEMPERATURE GRADIENTS.  THESE VALUES ARE      ISC02180
C                   0.0,0.0,0.0,0.0,0.02,0.035 FOR EACH OF THE SIX          ISC02190
C                   STABILITY CATEGORIES AND FOR ALL WIND SPEED             ISC02200
C                   CATEGORIES.                                             ISC02210
C                 =2, ENTER VERTICAL POTENTIAL TEMPERATURE GRADIENTS IN     ISC02220
C                     CARD GROUP 5, CARDS 7-12.  THE VALUES ARE USED        ISC02230
```

```
C                THROUGHOUT THE DATA CASE.  SEE CARD GROUP 5.          ISC02240
C              =3, THE PROGRAM READS ALL VERTICAL POTENTIAL TEMPERATURE ISC02250
C                GRADIENTS ON AN HOUR-TO-HOUR BASIS IN CARD GROUP 7.   ISC02260
C                SEE CARD GROUP 7.  NOTE THAT THIS OPTION IS           ISC02270
C                APPLICABLE ONLY IF HOURLY METEOROLOGICAL DATA IS      ISC02280
C                CARD INPUT (ISW(19) EQUALS 2).                        ISC02290
C              DEFAULT VALUE EQUALS 1.                                 ISC02300
C     ISW(23) - THIS PARAMETER ALLOWS THE SCALING OF SOURCE EMISSION    ISC02310
C              RATES AS A FUNCTION OF SEASON, MONTH, HOUR OF THE DAY   ISC02320
C              WIND SPEED AND STABILITY, OR A COMBINATION OF BOTH      ISC02330
C              SEASONAL AND HOUR OF THE DAY VARIANCE.  IF THIS PARA-   ISC02340
C              METER IS GREATER THAN ZERO THEN THE SOURCE EMISSION      ISC02350
C              RATES (Q) FOR ALL SOURCES ARE ADJUSTED DEPENDING ON     ISC02360
C              WHICH OPTION IS CHOSEN.  ALSO, THE USE OF THIS PARAMETER ISC02370
C              OVERRIDES THE INPUT PARAMETER QFLG (SEE CARD GROUP 6).  ISC02380
C              OTHERWISE IF ISW(23) EQUALS ZERO THEN THE SOURCE        ISC02390
C              EMISSION RATES FOR A GIVEN SOURCE MAY BE SCALED USING   ISC02400
C              THE CORRESPONDING QFLG PARAMETER FOR THAT SOURCE.  SET  ISC02410
C              ISW(23) TO THE VALUE ACCORDING TO THE LIST OF OPTIONS   ISC02420
C              BELOW.  THESE SAME OPTIONS ARE USED BY THE QFLG PARA-   ISC02430
C              METER FOR EACH SOURCE.  THE SCALING FACTOR VALUES ARE   ISC02440
C              ENTERED IN CARD GROUP 6, CARD 5 AND IN A FORMAT         ISC02450
C              DEPENDING ON WHICH OPTION IS SELECTED FROM ISW(23) (OR  ISC02460
C              QFLG).                                                  ISC02470
C              =0, NO SCALING OF THE SOURCE EMISSION RATES FOR ALL     ISC02480
C                SOURCES IS PERFORMED (EQUIVALENT TO MULTIPLYING       ISC02490
C                SOURCE STRENGTH, Q, BY 1.0).  SCALING OF INDIVIDUAL   ISC02500
C                SOURCE EMISSION RATES OF SOURCES MAY STILL BE         ISC02510
C                EXERCISED BY THE INPUT PARAMETER QFLG (SEE CARD       ISC02520
C                GROUP 6).                                             ISC02530
C              =1, SCALE SOURCE EMISSION RATES ACCORDING TO SEASON.    ISC02540
C                INPUT FOUR SCALARS IN CARD GROUP 6, CARD 5 FOR THE    ISC02550
C                WINTER, SPRING, SUMMER AND AUTUMN SEASONS.  A SEASON  ISC02560
C                IS DETERMINED FROM THE JULIAN DAY OF A 366-DAY YEAR.  ISC02570
C                WINTER INCLUDES JULIAN DAYS 336-60, SPRING 61-152,    ISC02580
C                SUMMER 153-244 AND AUTUMN 245-335.  THESE JULIAN      ISC02590
C                DAYS, FOR EACH SEASON, CORRESPOND WITH THE 3 MONTHS   ISC02600
C                OF EACH METEOROLOGICAL SEASON.                        ISC02610
C              =2, SCALE SOURCE EMISSION RATES ACCORDING TO MONTH.     ISC02620
C                INPUT TWELVE SCALARS IN CARD GROUP 6, CARD 5 FOR      ISC02630
C                EACH MONTH OF THE YEAR BEGINNING WITH JANUARY AND     ISC02640
C                PROCEEDING THROUGH THE YEAR TO DECEMBER.  A MONTH IS  ISC02650
C                DETERMINED FROM THE JULIAN DAY OF A 366-DAY YEAR.     ISC02660
C              =3, SCALE SOURCE EMISSION RATES BY HOUR OF THE DAY.     ISC02670
C                INPUT 24 SCALARS IN CARD GROUP 6, CARD 5 BEGINNING    ISC02680
C                WITH HOUR 1 FOR EACH HOUR OF THE DAY.                 ISC02690
C              =4, SCALE SOURCE EMISSION RATES DEPENDING ON BOTH THE   ISC02700
C                WIND SPEED AND STABILITY CATEGORY VALUES FOR A GIVEN  ISC02710
C                HOUR OF METEOROLOGICAL DATA.  INPUT SIX SETS OF SIX   ISC02720
C                SCALARS FOR EACH OF THE SIX STABILITY CATEGORIES       ISC02730
C                (A-F) BEGINNING WITH STABILITY CATEGORY A(=1).  FOR    ISC02740
C                EACH OF THE SIX SETS, SIX SCALARS ARE ENTERED FOR      ISC02750
C                EACH WIND SPEED CATEGORY BEGINNING WITH THE LOWEST     ISC02760
C                WIND SPEED CATEGORY.  HENCE, A TOTAL OF 36 SCALARS     ISC02770
C                ARE ENTERED IN CARD GROUP 6, CARD 5.                   ISC02780
C              =5, SCALE SOURCE EMISSION RATES DEPENDING ON BOTH SEASON ISC02790
C                AND HOUR OF THE DAY.  INPUT FOUR SETS OF 24 SCALARS   ISC02800
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C                   FOR EACH OF THE FOUR SEASONS BEGINNING WITH WINTER  ISC02810
C                   AND FOLLOWED BY SPRING, SUMMER AND AUTUMN.  A TOTAL ISC02820
C                   OF 96 SCALARS ARE ENTERED IN CARD GROUP 6, CARD 5.  ISC02830
C     ISW(24) - =1, PROGRAM USES FINAL PLUME RISE AT ALL RECEPTOR LOCA-  ISC02840
C                   TIONS.  RECEPTOR LOCATION IS NOT A FUNCTION OF THE  ISC02850
C                   PLUME RISE WITH THIS OPTION.                        ISC02860
C                 =2, PROGRAM COMPUTES PLUME RISE AS A FUNCTION OF THE  ISC02870
C                   DOWNWIND DISTANCE (RECEPTOR LOCATION).              ISC02880
C                 DEFAULT VALUE EQUALS 1.                               ISC02890
C     ISW(25) - =1, DO NOT MODIFY THE PHYSICAL STACK HEIGHT TO ACCOUNT  ISC02900
C                   FOR DOWNWASH.                                       ISC02910
C                 =2, MODIFY THE PHYSICAL STACK HEIGHT FOR ALL STACKS TO ISC02920
C                   ACCOUNT FOR STACK DOWNWASH ACCORDING TO             ISC02930
C                   BRIGGS, 1973.                                       ISC02940
C                 DEFAULT VALUE EQUALS 1.                               ISC02950
C     ISW(26) - =1, PROGRAM USES BUOYANCY INDUCED DIPERSION IN THE      ISC02960
C                    SIGMA-Y AND SIGMA-Z TERMS.                         ISC02970
C                 =2, PROGRAM DOES NOT INCLUDE BUOYANCY INDUCED DISPERSIONISC02980
C     ISW(27) - =1, PROGRAM USES A SUBPROGRAM TO SET                    ISC02990
C                   CONCENTRATIONS FOR CALM PERIODS EQUAL TO ZERO.      ISC03000
C                   IF CARD MET DATA(ISW(19)=2) ISW(27) IS SET TO 2     ISC03010
C                 =2, PROGRAM DOES NOT USE A SUBPROGRAM TO SET          ISC03020
C                   CONCENTRATIONS FOR CALM PERIODS EQUAL TO            ISC03030
C                   ZERO.                                               ISC03040
C     ISW(28) - =1, A REGULATORY DEFAULT MODE IS USED. NOTE, IF THIS    ISC03050
C                   OPTION IS SELECTED METEOROLOGY MUST BE INPUT         ISC03060
C                   VIA PRE-PROCESSED TAPE/FILE. IF THE USER            ISC03070
C                   ATTEMPTS TO RUN THE MODEL WITH THE REGULATORY       ISC03080
C                   DEFAULT OPTION AND CARD METEOROLOGY, AN             ISC03090
C                   ABNORMAL TERMINATION WILL RESULT.                   ISC03100
C                   IF CHOSEN, THIS OPTION WILL CAUSE VARIOUS MODEL     ISC03110
C                   OPTIONS TO BE OVERRIDEN WITH EPA RECOMMENDED VALUES.ISC03120
C                   THE FOLLOWING OPTIONS ARE CHANGED:                  ISC03130
C                  -TAPE/FILE PRE-PROCESSED METEOROLOGY ASSUMED.        ISC03140
C                  -FINAL PLUME RISE IS USED.                           ISC03150
C                  -BUOYANCY INDUCED DISPERSION IS USED.                ISC03160
C                  -STACK TIP DOWNWASH IS USED.                         ISC03170
C                  -DEFAULT WIND PROFILE COEFFICIENTS FOR RURAL         ISC03180
C                   MODE(.07,.07,.10,.15,.35,.55) AND URBAN             ISC03190
C                   MODE(.15,.15,.20,.25,.30,.30) FOR STABILITY         ISC03200
C                   CLASSES A-F ARE ASSIGNED.                           ISC03210
C                  -DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS     ISC03220
C                   (A 0.0, B 0.0, C 0.0, D 0.0, E .02, F .035 K/M)     ISC03230
C                  -A DECAY HALF LIFE OF 4 HOURS IS ASSIGNED IF         ISC03240
C                   SO2 IS MODELLED AND THE URBAN MODE IS               ISC03250
C                   DESIRED. OTHERWISE THE DECAY HALF LIFE IS           ISC03260
C                   SET TO INFINITY (NO DECAY).                         ISC03270
C                  -DIRECTION SPECIFIC BUILDING DOWNWASH AND ADJUSTMENTSISC03280
C                   TO PLUME RISE AND PLUME HEIGHT ARE USED.  WHEN THE  ISC03290
C                   PHYSICAL STACK HT IS LESS THAN HB + 0.5L WHERE HB ISISC03300
C                   THE BLDG HT AND L IS THE LESSER OF THE BLDG HT OR   ISC03310
C                   WIDTH.  (WHEN THIS OCCURS, BUOYANCY INDUCED DISPER- ISC03320
C                   SION IS NOT USED.)                                  ISC03330
C                 =2, PROGRAM DOES NOT USE A REGULATORY DEFAULT MODE.   ISC03340
C     ISW(29) - =1, IF SO2 IS MODELLED. NOTE THAT IF THE RUN IS         ISC03350
C                   URBAN AND THE REG. DEFAULT OPTION IS CHOSEN         ISC03360
C                   A HALF LIFE OF 4 HOURS IS ASSIGNED.                 ISC03370
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C                =2, IF POLLUTANT OTHER THAN SO2 IS MODELLED.                ISC03380
C     ISW(30) - =1, DEBUG MODE IS CALLED. ALL CARD INPUT IS                  ISC03390
C                   ECHOED AS SOON AS IT IS READ. THIS                       ISC03400
C                   OPTION IS USEFUL WHEN INPUT ERRORS ARE                   ISC03410
C                   DETECTED.                                                ISC03420
C                =2, DEBUG MODE NOT CALLED.                                  ISC03430
C     ISW(31) - =0, NO RECEPTOR HEIGHTS ABOVE GROUND ARE READ                ISC03440
C                =1, RECEPTOR HEIGHTS ABOVE GROUND IN METERS ARE READ        ISC03450
C                   FOR BOTH GRID AND DISCRETE RECEPTORS.                    ISC03460
C                                                                            ISC03470
C*CARD 2  FORMAT(8I6)                                                        ISC03480
C                                                                            ISC03490
C     NSOURC - NUMBER OF SOURCES                                             ISC03500
C     NXPNTS - NUMBER OF X POINTS IN THE X-AXIS FOR A CARTESIAN              ISC03510
C              COORDINATE RECEPTOR GRID OR THE NUMBER OF RANGES (RINGS)      ISC03520
C              FOR A POLAR COORDINATE RECEPTOR GRID.                         ISC03530
C     NYPNTS - NUMBER OF Y POINTS IN THE Y-AXIS FOR A CARTESIAN              ISC03540
C              COORDINATE RECEPTOR GRID OR THE NUMBER OF DIRECTIONS          ISC03550
C              (RADIALS) FOR A POLAR COORDINATE GRID.                        ISC03560
C     NDWYPT - NUMBER OF DISCRETE OR ARBITRARILY PLACED RECEPTORS.           ISC03570
C     NGROUP - NUMBER OF SOURCE GROUPS.  EACH SOURCE GROUP IS A              ISC03580
C              SELECTED NUMBER OF SOURCES SPECIFIED BY THE USER (SEE         ISC03590
C              DATA CARD GROUP 4) FROM THE NUMBER OF SOURCES                 ISC03600
C              PROCESSED IN THE PROBLEM RUN.  THE CONCENTRATION OR           ISC03610
C              DEPOSITION CONTRIBUTED COLLECTIVELY BY THE SOURCES            ISC03620
C              IN EACH SOURCE GROUP IS COMPUTED AND PRINTED DEPENDING        ISC03630
C              ON THE OPTIONS SELECTED IN DATA CARD GROUP 2, CARD 1.         ISC03640
C              IF LEFT BLANK OR ZERO, THE PROGRAM WILL SUM OVER ALL          ISC03650
C              SOURCES.  MAXIMUM EQUALS 150 SOURCE GROUPS.                   ISC03660
C     IPERD - THIS PARAMETER ALLOWS THE USER TO SPECIFY AN N-TH TIME         ISC03670
C             PERIOD FOR WHICH CONCENTRATIONS OR DEPOSITIONS ARE             ISC03680
C             PRINTED.  THIS PARAMETER IS USED IN CONJUNCTION WITH THE       ISC03690
C             ISW(7) - ISW(14) OPTIONS.  FOR EXAMPLE, IF ONE DESIRES TO      ISC03700
C             SEE THE FIFTH 3-HOUR PERIOD OF AVERAGE CONCENTRATION (OR       ISC03710
C             TOTAL DEPOSITION) THEN IPERD IS SET TO 5 AND ISW(8) IS SET     ISC03720
C             TO 1.  ALSO, ANY INVALID COMBINATIONS OF IPERD AND THE         ISC03730
C             TIME PERIOD ISW OPTIONS ARE IGNORED.  EXAMPLES OF THESE        ISC03740
C             ARE A FIFTH 24-HOUR TIME PERIOD OR A FOURTH 8-HOUR TIME        ISC03750
C             PERIOD.                                                        ISC03760
C                                                                            ISC03770
C     NOTE:  THE FOLLOWING 2 INPUT PARAMETERS ARE USED ONLY IF               ISC03780
C            METEOROLOGICAL DATA ARE CARD INPUT (ISW(19)=2).                 ISC03790
C     NHOURS - NUMBER OF HOURS PER DAY OF METEOROLOGICAL DATA.               ISC03800
C     NDAYS - NUMBER OF DAYS OF METEOROLOGICAL DATA.                         ISC03810
C             IF 0 OR BLANK, NDAYS IS SET TO 1.                              ISC03820
C                                                                            ISC03830
C*****CARD GROUP 3                                                           ISC03840
C         CARDS 1-3 FOR GRID TYPE RECEPTORS                                  ISC03850
C                                                                            ISC03860
C                                                                            ISC03870
C*CARD 1  FORMAT(8F10.0) THIS CARD IS NOT READ IF NXPNTS OR NYPNTS = 0.      ISC03880
C                                                                            ISC03890
C     GRIDX - IF ISW(2)=1, X-AXIS RECEPTOR ARRAY IN METERS.                  ISC03900
C             IF ISW(2) = 2 OR 4, RECEPTOR RANGE(RING) ARRAY IN METERS.      ISC03910
C             IF ISW(2)=3, GRIDX(1) IS THE STARTING LOCATION FOR THE         ISC03920
C             X-AXIS IN METERS AND GRIDX(2) IS THE INCREMENT AT WHICH        ISC03930
C             THE X-AXIS IS GENERATED IN METERS.                             ISC03940
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C                                                                       ISC03950
C*CARD 2  FORMAT(8F10.0) THIS CARD IS NOT READ IF NXPNTS OR NYPNTS = 0. ISC03960
C                                                                       ISC03970
C     GRIDY - IF ISW(2)=1, Y-AXIS RECEPTOR ARRAY IN METERS.             ISC03980
C             IS ISW(2)=2, RECEPTOR DIRECTION(RADIAL) ARRAY IN INTEGER  ISC03990
C             DEGREE VALUES WITHIN THE RANGE OF 1 TO 360 DEGREES.       ISC04000
C             DEFAULT VALUE = 360 DEGREES.                              ISC04010
C             IF ISW(2)=3, GRIDY(1) IS THE STARTING LOCATION FOR THE    ISC04020
C             Y-AXIS IN METERS AND GRIDY(2) IS THE INCREMENT AT WHICH   ISC04030
C             THE Y-AXIS IS GENERATED IN METERS.                        ISC04040
C             IF ISW(2)=4, GRIDY(1) IS THE STARTING DIRECTION(RADIAL)   ISC04050
C             IN INTEGER DEGREES AND GRIDY(2) IS THE INTEGER INCREMENT  ISC04060
C             AT WHICH THE RADIALS ARE GENERATED IN DEGREES.  THE       ISC04070
C             VALUES GENERATED MUST BE WITHIN THE RANGE OF 1 TO 360     ISC04080
C             DEGREES.                                                  ISC04090
C             DEFAULT VALUE = 360 DEGREES.                              ISC04100
C                                                                       ISC04110
C*CARD 3  FORMAT(8F10.0) THIS CARD IS READ ONLY IF ISW(4) = 1 OR -1     ISC04120
C         AND NXPNTS AND NYPNTS ARE BOTH NON-ZERO.                      ISC04130
C                                                                       ISC04140
C     GRIDZ - ARRAY OF TERRAIN ELEVATIONS FOR RECEPTORS IN FEET.        ISC04150
C             FOR EACH Y POINT (OR RADIALS) AN X-AXIS (OR RANGE) ARRAY  ISC04160
C             IS READ.  FOR EACH X-AXIS ARRAY READ, A NEW CARD IMAGE IS ISC04170
C             STARTED.                                                  ISC04180
C                                                                       ISC04190
C*CARD 3A  FORMAT(8F10.0) THIS CARD IS READ ONLY IF ISW(31) = 1         ISC04200
C          AND NXPNTS AND NYPNTS ARE BOTH NON-ZERO.                     ISC04210
C                                                                       ISC04220
C     RHT - ARRAY OF RECEPTOR HEIGHTS IN METERS ABOVE LOCAL TERRAIN.    ISC04230
C           FOR EACH Y POINT (OR RADIALS) AN X-AXIS (OR RANGE) ARRAY    ISC04240
C           IS READ.  FOR EACH X-AXIS ARRAY READ, A NEW CARD IMAGE IS   ISC04250
C           STARTED.                                                    ISC04260
C                                                                       ISC04270
C                                                                       ISC04280
C*CARD 4  FORMAT(4F10.0) FOR DISCRETE RECEPTORS.                        ISC04290
C             THIS CARD REPLACES CARDS 3                                ISC04300
C             AND 4 FROM UNAMAP VERSION 5. THIS CARD                    ISC04310
C             IS ONLY READ IF NXWYPT IS NON-ZERO.  INPUT                ISC04320
C             XDIS, YDIS, GRIDZ ON 1 CARD. THERE IS 1                   ISC04330
C             CARD FOR EACH DISCRETE RECEPTOR.                          ISC04340
C             IF TERRAIN ELEVATIONS ARE NOT CONSIDERED                  ISC04350
C             LEAVE THE THIRD ENTRY ON EACH CARD BLANK.                 ISC04360
C          IF ABOVE GROUND (FLAGPOLE) RECEPTORS ARE NOT USED            ISC04370
C             LEAVE THE LAST ENTRY ON EACH CARD BLANK.                  ISC04380
C             NXWYPT CARDS MUST BE INPUT.                               ISC04390
C                                                                       ISC04400
C     XDIS - IF ISW(3)=1,  X VALUE IN METERS FOR DISCRETE               ISC04410
C            RECEPTORS.                                                 ISC04420
C            IF ISW(3)=2,  RANGE IN METERS FOR DISCRETE                 ISC04430
C            RECEPTORS.                                                 ISC04440
C                                                                       ISC04450
C     YDIS - IF ISW(3)=1,  Y VALUE IN METERS FOR DISCRETE               ISC04460
C            RECEPTORS.                                                 ISC04470
C            IF ISW(3)=2,  DIRECTION(RADIAL) IN INTEGER                 ISC04480
C            DEGREE VALUES FOR DISCRETE RECEPTORS.  VALUES MUST BE      ISC04490
C            WITHIN 1 TO 360 DEGREES.                                   ISC04500
C            DEFAULT VALUE = 360 DEGREES.                               ISC04510
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C                                                                       ISC04520
C     GRIDZ -  TERRAIN ELEVATION FOR DISCRETE                           ISC04530
C              RECEPTORS IN FEET. NOTE ONLY 1 GRIDZ VALUE               ISC04540
C              IS READ FROM EACH DISCRETE RECEPTOR CARD.                ISC04550
C                                                                       ISC04560
C     RHT -  DISCRETE RECEPTOR HEIGHT ABOVE LOCAL TERRAIN.              ISC04570
C            RECEPTOR HEIGHT IN METERS. NOTE ONLY 1 HEIGHT              ISC04580
C            IS READ FROM EACH DISCRETE RECEPTOR CARD.                  ISC04590
C                                                                       ISC04600
C*****CARD GROUP 4  THIS CARD GROUP IS NOT READ IF NGROUP = 0.          ISC04610
C                                                                       ISC04620
C*CARD 1  FORMAT(20I4)                                                  ISC04630
C                                                                       ISC04640
C     NSOGRP - AN ARRAY OF INTEGERS INDICATING HOW MANY SOURCE NUMBERS  ISC04650
C              ARE TO BE READ FOR EACH SOURCE GROUP.  THE SOURCE NUMBERSISC04660
C              ARE READ IN THE ARRAY IDSOR.  SEE CARD 2 BELOW FOR AN    ISC04670
C              EXAMPLE OF THIS PARAMETER'S USE AND FOR THE EXPLANATION  ISC04680
C              OF THE PARAMETER IDSOR WHICH IS USED IN CONJUNCTION WITH ISC04690
C              NSOGRP.  A MAXIMUM OF 150 VALUES MAY BE INPUT.           ISC04700
C                                                                       ISC04710
C*CARD 2  FORMAT(13I6)                                                  ISC04720
C                                                                       ISC04730
C     IDSOR - AN INTEGER ARRAY CONTAINING THE SOURCE NUMBERS OR, THE    ISC04740
C             LOWER AND UPPER BOUND OF SOURCE NUMBERS TO BE SUMMED      ISC04750
C             TOGETHER.  THIS PARAMETER IS USED IN CONJUNCTION WITH     ISC04760
C             THE ARRAY NSOGRP IN CARD 1 ABOVE.  THE FOLLOWING EXAMPLE  ISC04770
C             SHOULD ILLUSTRATE THE USE OF THE PARAMETERS NGROUP (SEE   ISC04780
C             DATA CARD GROUP 2), NSOGRP AND IDSOR.  LET US ASSUME THAT ISC04790
C             WE HAVE 50 SOURCES WHOSE NUMBERS ARE 10,20,30,...,490,500.ISC04800
C             FIRST, IF THE USER DESIRES TO SEE THE CONCENTRATION (OR   ISC04810
C             DEPOSITION) FROM ALL SOURCES IN THE PROBLEM RUN, NAMELY,  ISC04820
C             THE 50 MENTIONED ABOVE THEN SET NGROUP TO 0.  THE         ISC04830
C             PARAMETERS NSOGRP AND IDSOR WOULD NOT BE INPUT.  INSTEAD  ISC04840
C             LET US SUPPOSE THAT WE DESIRE TO SEE THE CONCENTRATION    ISC04850
C             (OR DEPOSITION) INDIVIDUALLY FROM SOURCES 10, 100, 200,   ISC04860
C             300, 400 AND 500.  WE ALSO WISH TO SEE THE COMBINED       ISC04870
C             CONTRIBUTION FROM SOURCES 10 THROUGH 100; 50 THROUGH 260; ISC04880
C             100 THROUGH 200 PLUS 400 THROUGH 500; AND FINALLY ALL     ISC04890
C             SOURCES 10 THROUGH 500.  HENCE, THE CONCENTRATION (OR     ISC04900
C             (DEPOSITION) CONTRIBUTIONS FROM SIX INDIVIDUAL SOURCES    ISC04910
C             ARE DESIRED PLUS THE CONTRIBUTION FROM FOUR SETS OF       ISC04920
C             COMBINED SOURCES ARE DESIRED FOR A TOTAL OF TEN SOURCE    ISC04930
C             GROUPS.  THUS, ENTER THE VALUE 10 FOR NGROUP.  FOR NSOGRP ISC04940
C             ONE WOULD ENTER 1,1,1,1,1,1,2,2,4,2.  FOR THE IDSOR ARRAY ISC04950
C             ONE WOULD ENTER 10,100,200,300,400,500,10,-100,50,-260,   ISC04960
C             100,-200,400,-500,10,-500.  THE FIRST SIX ENTRIES OF BOTH ISC04970
C             NSOGRP AND IDSOR ARE IN A ONE-TO-ONE CORRESPONDENCE; THE  ISC04980
C             1 ENTERED IN NSOGRP IMPLIES THAT ONLY ONE SOURCE NUMBER   ISC04990
C             NEED BE READ IN THE IDSOR ARRAY FOR A COMPLETE SOURCE     ISC05000
C             GROUP CONTRIBUTION.  THE SEVENTH ENTRY IN NSOGRP, A 2,    ISC05010
C             INDICATES THAT THE SOURCE NUMBERS 10 AND -100 ARE TO BE   ISC05020
C             CONSIDERED FOR A SOURCE GROUP WHILE THE MINUS SIGN        ISC05030
C             INDICATES INCLUSIVE SUMMING FROM SOURCES 10 TO 100.  ONE  ISC05040
C             NEED NOT BE CONCERNED BY THE FACT THAT NO SOURCE NUMBER   ISC05050
C             OF, SAY, '43' EXISTS.  THE PROGRAM ONLY SUMS OVER THOSE   ISC05060
C             SOURCES DEFINED, NAMELY IN THIS CASE 10,20,30,...,90,100. ISC05070
C             LIKEWISE, ENTRY EIGHT IN NSOGRP, A 2, CALLS FOR A SOURCE  ISC05080
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C             GROUP INCLUDING SOURCES 50 THROUGH 260.  IF ONE DESIRES   ISC05090
C             SOURCE CONTRIBUTIONS FROM SOURCES BUT NOT FROM SOURCES    ISC05100
C             BETWEEN, THE NINTH ENTRY IN NSOGRP, A 4, ILLUSTRATES      ISC05110
C             THIS PROCEDURE.  THE FOUR IMPLIES THAT FOUR SOURCE NUMBERSISC05120
C             NEED BE READ IN ORDER TO DEFINE A SOURCE GROUP.  IN THIS  ISC05130
C             CASE THE FOUR SOURCE NUMBERS READ ARE 100,-200,400,-500   ISC05140
C             IMPLYING THAT THE INCLUSIVE SUMMATION OVER SOURCES 100    ISC05150
C             TO 200 AND 400 TO 500 ARE DESIRED EXCLUDING SOURCE        ISC05160
C             NUMBERS 210 THROUGH 390.  FINALLY, IT IS STILL POSSIBLE   ISC05170
C             TO OBTAIN THE COMBINED CONTRIBUTION FROM ALL SOURCES IN    ISC05180
C             THE PROBLEM RUN AS SHOWN IN THE LAST SOURCE GROUP.        ISC05190
C             IN SUMMARY; 1) NGROUP IS A VALUE USED TO REPRESENT THE    ISC05200
C             NUMBER OF SOURCE GROUPS DESIRED; 2) THE VALUES IN NSOGRP  ISC05210
C             INDICATE THE NUMBER OF SOURCE NUMBERS TO BE READ IN IDSOR;ISC05220
C             AND 3) IDSOR CONTAINS THE SOURCE NUMBERS USED TO          ISC05230
C             CONSTITUTE A SOURCE GROUP WHERE A MINUS SIGN IMPLIES      ISC05240
C             INCLUSIVE SUMMING FROM THE PREVIOUS SOURCE NUMBER ENTERED ISC05250
C             TO THE SOURCE NUMBER WITH THE MINUS SIGN.                 ISC05260
C             THE NUMBER OF VALUES CAN NOT EXCEED 200 IN THE IDSOR      ISC05270
C             ARRAY.                                                    ISC05280
C                                                                       ISC05290
C*****CARD GROUP 5                                                      ISC05300
C                                                                       ISC05310
C*CARDS 1-6  FORMAT(6F10.0)  THESE CARDS ARE READ ONLY IF ISW(21) IN     ISC05320
C                            CARD GROUP 2 EQUALS 2 AND  ISW(28) NE 1    ISC05330
C                                                                       ISC05340
C     PDEF - ENTER WIND PROFILE EXPONENTS FOR SIX STABILITY CATEGORIES   ISC05350
C            (A-F) AND SIX WIND SPEED CATEGORIES (ENTERED IN UCATS IN    ISC05360
C            CARD 13 BELOW).  FOR EACH STABILITY CATEGORY, BEGINNING     ISC05370
C            WITH STABILITY CATEGORY A, ENTER SIX WIND PROFILE EXPONENTSISC05380
C            FOR EACH WIND SPEED CATEGORY ON ONE CARD.  A TOTAL OF SIX   ISC05390
C            CARDS ARE READ FOR A TOTAL OF 36 VALUES.                    ISC05400
C                                                                       ISC05410
C*CARDS 7-12  FORMAT(6F10.0)  THESE CARDS ARE READ ONLY IF ISW(22) IN    ISC05420
C                             CARD GROUP 2 EQUALS 2 AND ISW(28) NE 1    ISC05430
C                                                                       ISC05440
C     DTHDEF - ENTER VERTICAL POTENTIAL TEMPERATURE GRADIENTS (DEGREES  ISC05450
C              KELVIN/METER) FOR SIX STABILITY CATEGORIES (A-F) AND     ISC05460
C              SIX WIND SPEED CATEGORIES (ENTERED IN UCATS IN DATA CARD ISC05470
C              13 BELOW).  FOR EACH STABILITY CATEGORY, BEGINNING WITH  ISC05480
C              STABILITY CATEGORY A, ENTER SIX GRADIENT VALUES ON ONE   ISC05490
C              CARD.  A TOTAL OF SIX CARDS ARE READ FOR A TOTAL OF 36   ISC05500
C              VALUES.                                                  ISC05510
C                                                                       ISC05520
C*CARD 13  FORMAT(6F10.0)                                               ISC05530
C                                                                       ISC05540
C     ZR - HEIGHT AT WHICH THE WIND SPEED WAS MEASURED (METERS).        ISC05550
C          DEFAULT ASSUMES 10.0 METERS.                                 ISC05560
C     UCATS - INPUT THE UPPER BOUND OF THE FIRST THROUGH FIFTH WIND     ISC05570
C             SPEED CATEGORIES IN METERS PER SECOND.  DEFAULT VALUES    ISC05580
C             EQUAL 1.54, 3.09, 5.14, 8.23, 10.80 RESPECTIVELY.         ISC05590
C                                                                       ISC05600
C*CARD 14  FORMAT(E8.0,1F8.0,3A4,7A4,2I2)                               ISC05610
C                                                                       ISC05620
C     TK - SOURCE EMISSION RATE UNITS CONVERSION FACTOR.  IF 0 OR BLANK,ISC05630
C          TK IS SET TO 10**6 FOR CONCENTRATION AND 1.0 FOR DEPOSITION. ISC05640
C     DECAY - WASHOUT COEFFICIENT FOR PRECIPITATION SCAVENGING.  IF 0   ISC05650
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C             OR BLANK, NO SCAVENGING IS ASSUMED.  THE VALUE ENTERED    ISC05660
C             FOR THIS PARAMETER IS IGNORED BY THE PROGRAM IF CARD      ISC05670
C             METEOROLOGICAL DATA ARE INPUT (ISW(19)=2).                ISC05680
C             NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN            ISC05690
C             AND SO2 IS MODELLED IN AN URBAN MODE THE DECAY            ISC05700
C             TERM IS SET = TO .0000481(4 HR HALF LIFE).                ISC05710
C     IQUN - 12 CHARACTERS IDENTIFYING EMISSION RATE (Q) UNITS.  IF     ISC05720
C            BLANK, EMISSION RATE IS ASSUMED IN (GRAM/SEC) FOR          ISC05730
C            CONCENTRATION AND (GRAMS) FOR DEPOSITION.                  ISC05740
C     ICHIUN - 28 CHARACTERS IDENTIFYING OUTPUT UNITS.  IF BLANK, OUTPUTISC05750
C              FOR CONCENTRATION IS (MICROGRAMS/CUBIC METER) AND FOR    ISC05760
C              DEPOSITION IS (GRAMS/SQUARE METER).                      ISC05770
C     IMET - LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA.  DEFAULT VALUE ISC05780
C            EQUALS 9 FOR PREPROCESSED DATA (ISW(19)=1), AND EQUALS 5   ISC05790
C            (CURRENT VALUE OF INTERNAL VARIABLE 'IN') FOR CARD DATA    ISC05800
C            (ISW(19)=2).                                               ISC05810
C     ITAP - LOGICAL UNIT NUMBER OF TAPE OUTPUT OPTION.  IF 0 OR BLANK, ISC05820
C            ITAP IS SET TO 3.                                          ISC05830
C                                                                       ISC05840
C*CARDS 15-19  FORMAT(80I1)  THESE CARDS ARE READ ONLY IF PRE-PROCESSED ISC05850
C                            METEOROLOGICAL DATA ARE USED (ISW(19)=1).  ISC05860
C                                                                       ISC05870
C     IDAY - ARRAY OF 366 INDICATING WHICH DAYS OF METEOROLOGY ARE TO   ISC05880
C            BE USED BY THE PROGRAM.  FOR EXAMPLE, IF DAY(140)=1 THEN   ISC05890
C            DAY 140 WILL BE USED ALONG WITH ANY OTHER VALUES SET TO 1. ISC05900
C                                                                       ISC05910
C*CARD 20  FORMAT(4I6)  THIS CARD IS READ ONLY IF PRE-PROCESSED         ISC05920
C                       METEOROLOGICAL DATA ARE USED (ISW(19)=1).       ISC05930
C                                                                       ISC05940
C     ISS - SURFACE STATION NUMBER TO BE MATCHED WITH NUMBER READ FROM  ISC05950
C           METEOROLOGICAL DATA.                                        ISC05960
C     ISY - YEAR OF SURFACE DATA, A TWO DIGIT INTEGER.                  ISC05970
C     IUS - UPPER AIR STATION NUMBER TO BE MATCHED WITH NUMBER READ     ISC05980
C           FROM METEOROLOGICAL DATA.                                   ISC05990
C     IUY - YEAR OF UPPER AIR DATA, A TWO DIGIT NUMBER.                 ISC06000
C                                                                       ISC06010
C*****CARD GROUP 6                                                      ISC06020
C                                                                       ISC06030
C*CARD 1  FORMAT(I5,2I1,I2,I1,F8.0,2F7.0,8F6.0)  THIS CARD IS REPEATED  ISC06040
C                                                 'NSOURC' TIMES.       ISC06050
C                                                                       ISC06060
C     NSO - SOURCE IDENTIFICATION NUMBER.  MUST BE A POSITIVE NUMBER.   ISC06 70
C     ITYPE - =0, STACK TYPE SOURCE.                                    ISC06080
C             =1, VOLUME TYPE SOURCE.                                   ISC06090
C             =2, AREA TYPE SOURCE.                                     ISC06100
C     NAKE - STACK WAKE EFFECTS OPTION FOR CHOOSING WHICH SIGMA Y       ISC06110
C            EQUATION TO USE.                                           ISC06120
C            =0, 'UPPER BOUND' CONCENTRATION IS CALCULATED.             ISC06130
C            =1, 'LOWER BOUND' CONCENTRATION IS CALCULATED.             ISC06140
C            DEFAULT ASSUMES 0.                                         ISC06150
C            REFER TO SECTION 2.4.1.1.D OF THE USER'S GUIDE FOR A MORE  ISC06160
C            COMPLETE DISCUSSION OF THIS OPTION.                        ISC06170
C     NVS - NUMBER OF GRAVITATIONAL SETTLING CATEGORIES.  MAXIMUM OF    ISC06180
C           20.  IF > 0, CARDS 2-4 BELOW ARE READ IMMEDIATELY FOLLOWING ISC06190
C           THIS SOURCE INPUT CARD.                                     ISC06200
C     QFLG - THIS PARAMETER ALLOWS THE SCALING OF THE SOURCE EMISSION   ISC06210
C            RATE FOR THIS SOURCE AS A FUNCTION OF SEASON, MONTH, HOUR  ISC06220
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C           OF THE DAY, WIND SPEED AND STABILITY, OR A COMBINATION OF  ISC06230
C           BOTH SEASONAL AND HOUR OF THE DAY VARIANCE.  IF THE PARA-  ISC06240
C           METER ISW(23) IN CARD GROUP 2 IS GREATER THAN 0 THEN THIS  ISC06250
C           PARAMETER IS IGNORED.  IF ISW(23) = 2, QFLG MAY BE USED IN ISC06260
C           AN ANALOGOUS MANNER TO ISW(23) EXCEPT ONLY THE SOURCE FOR  ISC06270
C           WHICH QFLG > 0 IS AFFECTED.  ALL VALID VALUES FOR ISW(23)  ISC06280
C           APPLY FOR THIS PARAMETER (QFLG).  THE SOURCE EMISSION      ISC06290
C           RATE SCALARS ARE ENTERED IN CARD 5 BELOW.                  ISC06300
C                                                                      ISC06310
C     Q - SOURCE EMISSION RATE.                                        ISC06320
C         FOR CONCENTRATION AND TYPE 0 & 1 SOURCES,                    ISC06330
C         UNITS ARE IN MASS PER UNIT TIME, TYPE 2 SOURCE UNITS ARE IN  ISC06340
C         MASS PER UNIT TIME PER UNIT AREA.  FOR DEPOSITION AND TYPE   ISC06350
C         0 & 1 SOURCES, UNITS ARE IN MASS, TYPE 2 SOURCE UNITS ARE    ISC06360
C         IN MASS PER UNIT AREA.                                       ISC06370
C     XS - X LOCATION OF SOURCE IN METERS.                             ISC06380
C     YS - Y LOCATION OF SOURCE IN METERS.                             ISC06390
C     ZS - ELEVATION OF SOURCE AT SOURCE BASE IN METERS.               ISC06400
C     HS - HEIGHT OF SOURCE ABOVE GROUND IN METERS.                    ISC06410
C     TS - FOR TYPE 0 SOURCES, STACK EXIT TEMPERATURE IN DEGREES KELVIN.ISC06420
C          FOR TYPE 1 SOURCES, INITIAL VERTICAL DIMENSION IN METERS.   ISC06430
C     VS - FOR TYPE 0 SOURCES, STACK EXIT VELOCITY IN METERS PER SECOND.ISC06440
C          FOR TYPE 1 SOURCES, INITIAL HORIZONTAL DIMENSION IN METERS. ISC06450
C          FOR TYPE 2 SOURCES, WIDTH OF SOURCE IN METERS.              ISC06460
C     NOTE:  THE FOLLOWING FOUR INPUT PARAMETERS ARE FOR STACK-TYPE    ISC06470
C            SOURCES ONLY.                                             ISC06480
C     D - STACK INNER DIAMETER IN METERS.                              ISC06490
C     HB - HEIGHT OF BUILDING ADJACENT TO STACK IN METERS.             ISC06500
C          IF THE REGULATORY MODE IS SELECTED (ISW(28)='1') AND HS IS  ISC06510
C          LESS THAN OR EQUAL TO HB + ONE-HALF TIMES THE LESSER OF HB OR ISC06520
C          1.13*BW, THE PROGRAM EXPECTS TO READ AND USE 36 DIRECTION   ISC06530
C          SPECIFIC BUILDING HEIGHTS AND WIDTHS FROM CARDS 4A AND 4B OF ISC06540
C          THIS GROUP.  IF INPUT AS A NEGATIVE VALUE AND THE HEIGHT    ISC06550
C          CRITERIA IS NOT MET, THE PROGRAM READS PAST THE SIX LINES.  ISC06560
C     HL - LENGTH OF BUILDING ADJACENT TO STACK IN METERS.             ISC06570
C     HW - WIDTH OF BUILDING ADJACENT TO STACK IN METERS.              ISC06580
C                                                                      ISC06590
C*CARDS 2-4  FORMAT(8F10.0)  THESE CARDS ARE READ ONLY IF THE PARAMETER ISC06600
C                            NVS IN CARD 1 ABOVE IS > 0 FOR A GIVEN    ISC06610
C                            SOURCE.  IF SO, THESE CARDS ARE READ      ISC06620
C                            IMMEDIATELY FOLLOWING THE SOURCE CARD     ISC06630
C                            (CARD 1) ON WHICH THE PARAMETER NVS > 0.  ISC06640
C                                                                      ISC06650
C     PHI - ARRAY CONTAINING THE MASS FRACTION OF PARTICULATES FOR ALL ISC06660
C           SETTLING CATEGORIES.  MAXIMUM OF 20 VALUES.                ISC06670
C     VSN - ARRAY CONTAINING THE GRAVITATIONAL SETTLING VELOCITY FOR   ISC06680
C           PARTICULATES FOR ALL SETTLING CATEGORIES.  MAXIMUM OF 20   ISC06690
C           VALUES.                                                    ISC06700
C     GAMMA - ARRAY CONTAINING THE SURFACE REFLECTION COEFFICIENT FOR  ISC06710
C             PARTICULATES FOR ALL SETTLING CATEGORIES.  MAXIMUM OF    ISC06720
C             20 VALUES.                                               ISC06730
C                                                                      ISC06740
C*CARDS 4A-4B  FORMAT(12F6.0)  THESE CARDS ARE READ ONLY IF THE VALUE  ISC06750
C                              OF HB IS < 0 FOR A GIVEN SOURCE.  IF    ISC06760
C                              SO, THESE CARDS ARE READ AFTER CARDS    ISC06770
C                              2-4 IF NVS > 0 OR AFTER THE SOURCE CARD ISC06780
C                              (CARD 1) IF NVS = 0.                    ISC06790
C
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C     BH - 36 DIRECTION SPECIFIC BUILDING HEIGHTS STARTING AT 10        ISC06800
C          DEGREES AND RUNNING THROUGH 360 DEGREES WITH THE APPROPRIATE ISC06810
C          DIRECTION SPECIFIC BUILDING HEIGHTS AND PROJECTED WIDTHS FOR ISC06820
C          EACH DIRECTION.  NEGATIVE VALUES OF BH ARE USED TO DENOTE    ISC06830
C          THE LOWER BOUND WAKE EFFECTS CALCULATIONS. (SEE WAKE ABOVE)  ISC06840
C     BW - 36 DIRECTION SPECIFIC BUILDING WIDTHS STARTING AT THE 10     ISC06850
C          DEGREE FLOW VECTOR AND RUNNING THROUGH 360 DEGREES.          ISC06 60
C                                                                       ISC06870
C*CARD 5  FORMAT(8F10.0)  THIS CARD IS READ ONCE ONLY IF ISW(23) IN DATAISC06880
C                         CARD GROUP 2 > 0.  IF ISW(23) = 0, THIS CARD  ISC06890
C                         IS REPEATED FOR EACH SOURCE WHERE QFLG > 0 AS ISC06900
C                         INDICATED IN CARD 1 ABOVE.  IF ISW(23) = 0 ANDISC06910
C                         QFLG = 0 FOR ALL SOURCES, THIS CARD IS NOT    ISC06920
C                         READ.                                         ISC06930
C                                                                       ISC06940
C     QTK - ENTER SOURCE EMISSION RATE SCALARS IN A FORMAT DEPENDING    ISC06950
C           ON THE VALUE OF ISW(23) (OR QFLG).  THE FORMAT IS THOROUGHLYISC06960
C           DISCUSSED IN THE DESCRIPTION OF PARAMETER ISW(23) IN CARD  ISC06970
C           GROUP 2.  THE FOLLOWING IS A SUMMARY OF THE AFOREMENTIONED  ISC06980
C           FORMAT.  IF ISW(23) (OR QFLG) = 1, ENTER 4 SEASONAL SCALARS ISC06990
C           ON ONE CARD; = 2, ENTER 12 MONTHLY SCALARS.  TWO CARDS ARE  ISC07000
C           READ; =3, ENTER 24 HOURLY SCALARS.  THREE CARDS ARE READ;   ISC07010
C           = 4, ENTER 6 SCALARS FOR EACH WIND SPEED CATEGORY PER CARD  ISC07020
C           FOR EACH OF THE SIX STABILITY CATEGORIES.  SIX CARDS ARE    ISC07030
C           READ FOR A TOTAL OF 36 SCALARS; = 5, ENTER FOUR SETS OF 24  ISC07040
C           HOURLY SCALARS.  EACH SET REPRESENTS ONE SEASON OF SCALARS. ISC07050
C           A TOTAL OF 12 CARDS ARE READ FOR A TOTAL OF 96 VALUES.      ISC07060
C                                                                       ISC07070
C*****CARD GROUP 7  FORMAT(I6,5F8.0,I8,2F8.0)                          ISC07080
C                   THIS CARD GROUP IS READ ONLY IF CARD METEOROLOGICAL ISC07090
C                   DATA ARE ENTERED (ISW(19)=2).  THIS CARD GROUP      ISC07100
C                   CONSISTS OF 'NHOURS' CARDS.  THIS CARD GROUP IS     ISC07110
C                   REPEATED 'NDAYS' TIMES.                             ISC07120
C                                                                       ISC07130
C     JDAY - JULIAN DAY OF METEOROLOGICAL DATA.  THIS IS USED TO        ISC07140
C            COMPUTE SEASON OR MONTH FOR ANY SOURCES WHICH HAVE         ISC07150
C            VARIATIONAL EMISSION RATES.  THE PROGRAM USES THE JDAY     ISC07160
C            VALUE READ FOR THE FIRST HOUR OF EACH DAY.  THE SECOND     ISC07170
C            AND SUCCESSIVE HOURS FOR EACH DAY ARE IGNORED.  DEFAULT    ISC07180
C            VALUE = 1.                                                 ISC07190
C     AFV - WIND FLOW VECTOR. DIRECTION IN DEGREES TO WHICH THE WIND    ISC07200
C           IS FLOWING.                                                 ISC07210
C     AWS - WIND SPEED IN METERS PER SECOND AT REFERENCE HEIGHT 'ZR'.   ISC07220
C     HLH - HEIGHT OF SURFACE MIXING LAYER IN METERS.                   ISC07230
C     TEMP - AMBIENT AIR TEMPERATURE IN DEGREES KELVIN.                 ISC07240
C     DTHDZ - VERTICAL POTENTIAL TEMPERATURE GRADIENT IN DEGREES KELVIN ISC07250
C             PER METER.                                                ISC07260
C             THIS VALUE IS READ ONLY IF ISW(22) EQUALS 3.              ISC07270
C             THE VALUE OF DTHDZ IS NOT USED IF THE REG. DEFAULT        ISC07280
C             OPTION, ISW(28), IS CHOSEN. DEFAULTS ARE USED.            ISC07290
C     IST - PASQUILL STABILITY CATEGORY.  A=1, B=2, C=3, ETC.           ISC07300
C     P - WIND PROFILE EXPONENT.                                        ISC07310
C         THIS VALUE IS READ ONLY IF ISW(21) EQUALS 3.                  ISC07320
C         THE VALUE OF P IS NOT USED IF THE REG. DEFAULT                ISC07330
C         OPTION, ISW(28), IS CHOSEN. DEFAULTS ARE USED.                ISC07340
C     DECAY - DECAY COEFFICIENT.  THE VALUE OF THIS PARAMETER OVERRIDES ISC07350
C             THE PARAMETER DECAY IN CARD GROUP 5.                      ISC07360
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C            NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN                ISC07370
C            AND SO2 IS MODELLED IN AN URBAN MODE THE DECAY                ISC07380
C     TERM IS SET = TO .0000481 SECONDS**-1.                               ISC07390
C     WHERE .0000481=.693/(3600*4)     4 HR SO2 HALF LIFE.                 ISC07400
C                                                                          ISC07410
C*************************************************************************ISC07420
C                                                                          ISC07430
C                                                                          ISC07440
C     THIS IS THE MAIN PROGRAM OF THE EPA INDUSTRIAL SOURCE COMPLEX        ISC07450
C     SHORT TERM MODEL.  THIS ROUTINE'S PURPOSE IS TO CALCULATE THE        ISC07460
C     AMOUNT OF STORAGE REQUIRED FOR TABLES, RECEPTOR GRID AND SOURCE      ISC07470
C     INFORMATION.  IN ORDER FOR THESE CALCULATIONS TO BE MADE THE 'ISW'   ISC07480
C     ARRAY, THE VARIABLES WHICH DETERMINE THE NUMBER OF RECEPTORS AND     ISC07490
C     THE NUMBER OF SOURCES ARE READ.                                      ISC07500
C                                                                          ISC07510
C                                                                          ISC07520
      INTEGER TITLE                                                        ISC07530
      COMMON QF(43500)                                                     ISC07540
      DIMENSION IZERO(161),IQF(1)                                          ISC07550
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,           ISC07560
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,   ISC07570
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,I13              ISC07580
      EQUIVALENCE (ISW,IZERO),(QF,IQF)                                     ISC07590
C     SET MAXIMUM LIMIT FOR 'QF' ARRAY.  MUST AGREE WITH VALUE USED TO     ISC07600
C     DIMENSION 'QF'.                                                      ISC07610
      LIMIT = 43500                                                        ISC07620
C     CLEAR 'QF' ARRAY AND 'LOGIX' BLOCK.                                  ISC07630
      DO 10  I = 1,LIMIT                                                   ISC07640
   10 QF(I) = 0.0                                                          ISC07650
      DO 20  I = 1,161                                                     ISC07660
   20 IZERO(I) = 0                                                         ISC07670
C     SET INPUT AND OUTPUT LOGICAL UNIT NUMBERS.                           ISC07680
      IN = 5                                                               ISC07690
      IO = 6                                                               ISC07700
      WRITE (6,1234)                                                       ISC07710
 1234 FORMAT ('1',21X,'ISCST (DATED 87338) '/                              ISC07720
     1 22X,'AN AIR QUALITY DISPERSION MODEL IN'/                           ISC07730
     2 22X,'SECTION 1.  GUIDELINE MODELS'/                                 ISC07740
     3 22X,'IN UNAMAP (VERSION 6)  JULY 86.'/                              ISC07750
     4 22X,'SOURCE:  UNAMAP FILE ON EPA''S UNIVAC AT RTP, NC. ')           ISC07760
C     INPUT TITLE.                                                         ISC07770
      READ(IN,9001) (TITLE(I),I=1,15)                                      ISC07780
C     INPUT LOGIC OPTIONS.                                                 ISC07790
      READ(IN,9002) (ISW(I),I=1,40)                                        ISC07800
      IF(ISW(30).EQ.1) THEN                                                ISC07810
      WRITE(IO,9502) (ISW(I),I=1,40)                                       ISC07820
      ENDIF                                                                ISC07830
C     CHANGE PARAMETERS IF REGULATORY DEFAULT OPTION DESIRED               ISC07840
      IF(ISW(28).NE.1) GO TO 27                                            ISC07850
      ISW(19)=1                                                            ISC07860
C     PRE-PROCESSED METEOROLOGICAL TAPE/FILE ASSUMED.                      ISC07870
      ISW(21)=1                                                            ISC07880
C     DEFAULT WIND PROFILE EXPONENTS (RURAL AND URBAN)                     ISC07890
      ISW(22)=1                                                            ISC07900
C     DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS.                    ISC07910
      ISW(24)=1                                                            ISC07920
C     FINAL PLUME RISE                                                     ISC07930
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      ISW(25)=2                                                          ISC07940
C     STACK TIP DOWNWASH INCORPORATED                                    ISC07950
      ISW(26)=1                                                          ISC07960
C     BUOYANCY INDUCED DISPERSION INCORPORATED                           ISC07970
      ISW(27)=1                                                          ISC07980
C     CALM WIND PROCESSING                                               ISC07990
 27   CONTINUE                                                           ISC08000
C     RESET ISW(27), CALMS OPTION IF CARD MET                            ISC08010
      IF(ISW(19).EQ.2) ISW(27)=2                                         ISC08020
C     INPUT SOURCE & RECEPTOR SIZE VALUES.                               ISC08030
      READ(IN,9003) NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,IPERD,NHOURS,     ISC08040
     1 NDAYS                                                             ISC08050
      IF(ISW(30).EQ.1) THEN                                              ISC08060
      WRITE(IO,9503) NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,IPERD,NHOURS,    ISC08070
     1 NDAYS                                                             ISC08080
      ENDIF                                                              ISC08090
C     DETERMINE NUMBER OF TIME PERIODS TO BE CALCULATED.                 ISC08100
      NAVG = 0                                                           ISC08110
      DO 30  I = 7,14                                                    ISC08120
      IF (ISW(I) .LE. 0) GOTO 30                                         ISC08130
      NAVG = NAVG + 1                                                    ISC08140
   30 CONTINUE                                                           ISC08150
      IF(NAVG.NE.0) GO TO 35                                             ISC08160
      IF(ISW(15).EQ.0) GO TO 80                                          ISC08170
      ISW(16)=0                                                          ISC08180
      ISW(17)=0                                                          ISC08190
      ISW(18)=0                                                          ISC08200
C     CALCULATE TOTAL NUMBER OF RECEPTORS.                               ISC08210
   35 NPNTS = NXPNTS*NYPNTS + NXWYPT                                     ISC08220
      NGROPS = NGROUP                                                    ISC08230
      IF(NGROUP .LE. 0) NGROPS = 1                                       ISC08240
      NN = NAVG*NPNTS*NGROPS                                             ISC08250
C     CALCULATE INDICES FOR STORAGE ALLOCATION.                          ISC08260
      I1 = NPNTS + NPNTS + 1                                             ISC08270
      I2 = I1 + NN                                                       ISC08280
      I3 = I2                                                            ISC08290
      IF(ISW(15) .EQ. 1) I3 = I2 + NPNTS*NGROPS                          ISC08300
      I4 = I3                                                            ISC08310
      I5 = I3                                                            ISC08320
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 40                       ISC08330
      I4 = I3 + NXPNTS                                                   ISC08340
      I5 = I4 + NYPNTS                                                   ISC08350
   40 I6 = I5                                                            ISC08360
      I7 = I5                                                            ISC08370
      IF(NXWYPT .EQ. 0) GOTO 50                                          ISC08380
      I6 = I5 + NXWYPT                                                   ISC08390
      I7 = I6 + NXWYPT                                                   ISC08400
   50 I8 = I7                                                            ISC08410
      IF(ISW(4) .NE. 0) I8 = I7 + NPNTS                                  ISC08420
C     INSERT ABOVE GROUND RECEPTORS HTS. INTO CALC. OF STORAGE           ISC08430
      I8A = I8                                                           ISC08440
      IF (ISW(31) .NE. 0) I8A = I8 + NPNTS                               ISC08450
      I9 = I8A                                                           ISC08460
      I10 = 4                                                            ISC08470
      IF(ISW(17).GT.1) I10=6                                             ISC08480
      IF(ISW(17) .NE. 0) I9 = I8A + I10*NN                               ISC08490
      I10 = I9                                                           ISC08500
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      I11 = I10                                                          ISC08510
      I12 = I10                                                          ISC08520
      IF(ISW(16) .LE. 0) GOTO 60                                         ISC08530
      I10 = I9 + 150*NAVG*NGROPS                                         ISC08540
      I11 = I10 + 50*NAVG*NGROPS                                         ISC08550
      I12 = I11 + NAVG*NGROPS                                            ISC08560
   60 I13 = I12 + 287*NSOURC - 1                                         ISC08570
C     DETERMINE IF CALCULATED STORAGE ALLOCATION EXCEEDS LIMIT.          ISC08580
      IF(I13 .LE. LIMIT) GOTO 70                                         ISC08590
      WRITE(IO,9004) I13,LIMIT                                           ISC08600
      GO TO 90                                                           ISC08610
C     CALL INPUT ROUTINE.                                                ISC08620
   70 CALL INCHK(QF(I3),QF(I4),QF(I5),QF(I6),QF(I7),QF(I8),QF(I12))      ISC08630
C                                                                        ISC08640
C     CALL MODEL ROUTINE.                                                ISC08650
      CALL MODEL(QF(1),QF(I1),QF(I2),QF(I3),QF(I4),QF(I5),QF(I6),QF(I7),ISC08660
     1 QF(I8),QF(I8A),QF(I9),IQF(I10),IQF(I11),QF(I12))                  ISC08670
      GO TO 90                                                           ISC08680
   80 WRITE (IO,9005)                                                    ISC08690
   90 CONTINUE                                                           ISC08700
      STOP                                                               ISC08710
 9001 FORMAT(15A4)                                                       ISC08720
 9002 FORMAT(40I2)                                                       ISC08730
 9003 FORMAT(13I6)                                                       ISC08740
 9004 FORMAT(59H1   ***ERROR***  CALCULATED STORAGE ALLOCATION LIMIT EQUISC08750
     1ALS,I6,/52H AND EXCEEDS THE MAXIMUM STORAGE ALLOCATION LIMIT OF,I6ISC08760
     2,/16H RUN TERMINATED.)                                             ISC08770
 9005 FORMAT (C4H1 ***ERROR*** ISW(7) THROUGH ISW(15) ARE ZERO, SPECIFY ISC08780
     1ONE OR MORE OF THESE OPTIONS.)                                     ISC08790
 9501 FORMAT(1X,15A4)                                                    ISC08800
 9502 FORMAT(1X,40I2)                                                    ISC08810
 9503 FORMAT(1X,13I6)                                                    ISC08820
      END                                                                ISC08830
C                                                                        ISC08840
      SUBROUTINE INCHK(GRIDX,GRIDY,XDIS,YDIS,GRIDZ,RHT,SOURCE)          ISC08850
C               SUBROUTINE INCHK (VERSION 5733C), PART OF ISCST.         ISC08860
C                                                                        ISC08870
C     THIS ROUTINE READS THE REST OF THE INPUT VARIABLES AND PROVIDES    ISC08880
C     DEFAULT VALUES IF REQUIRED.  ALSO TABLES LISTING THE INPUT VARI-   ISC08890
C     ABLES ARE CONTROLLED BY THIS ROUTINE.                              ISC08900
C                                                                        ISC08910
      LOGICAL DONE,TER,HGT                                               ISC08920
      INTEGER TITLE,WAKE,QFLG,QFLGS                                      ISC08930
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NDWYPT,NGROUP,         ISC08940
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE, ISC08950
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),COMDEP(6),LIMIT,MINLT           ISC08960
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),         ISC08970
     1 AFVR(24),HUH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),           ISC08980
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                       ISC08990
      DIMENSION GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),GRIDZ(1),SOURCE(287,1)ISC09000
     1,RHT(1)                                                            ISC09010
      DIMENSION METER(2),SEASON(2,4),ATHRUF(6),UCTDEF(5),IWAKSW(36)      ISC09020
C     PDEFU AND PDEFR ARE URBAN AND RURAL DEFAULT WIND                   ISC09030
C     PROFILE EXPONENTS                                                  ISC09040
      DIMENSION PDEFR(6),PDEFU(6)                                        ISC09050
      EQUIVALENCE (ISW(23),QFLGS)                                        ISC09060
      DATA ATHRUF / 1HA,1HB,1HC,1HD,1HE,1H /                             ISC09070
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      DATA PDEFU/.15,.15,.20,.25,.30,.30/                                ISC09080
      DATA PDEFR/.07,.07,.10,.15,.35,.55/                                ISC09090
      DATA UCTDEF / 1.54,3.09,5.14,8.23,10.8 /                           ISC09100
      DATA METER /4H(MET,4HER$)/                                         ISC09110
      DATA SEASON /4HWINT,4HER  ,4HSPRI,4HNG  ,4HSUMM,4HER  ,4HAUTU,     ISC09120
     1 4HMN   /                                                          ISC09130
      DATA IBLANK /4H    /                                               ISC09140
C     CHECK 'ISW' AND SET DEFAULT VALUES.                                ISC09150
C     DEFAULT TO CONCENTRATION ON RECTANGULAR GRID & DISCRETE POINTS.    ISC09160
   10 IF(ISW(1) .LE. 0) ISW(1) = 1                                       ISC09170
      IF(ISW(2) .LE. 0) ISW(2) = 1                                       ISC09180
      IF(ISW(3) .LE. 0) ISW(3) = 1                                       ISC09190
C     DEFAULT CARD MET PARAMETERS.                                       ISC09200
      IF(NDAYS .LE. 0) NDAYS = 1                                         ISC09210
C     DEFAULT TO PRE-PROCESSED MET DATA WITH RURAL OPTION.               ISC09220
      IF(ISW(19).LE.0) ISW(19)=1                                         ISC09230
      IF(ISW(19) .EQ. 2 .AND. ISW(20) .NE. 3) ISW(20) = 0                ISC09240
C     DEFAULT TO PROGRAM'S WIND PROFILE EXPONENT AND VERTICAL POTENTIAL   ISC09250
C     TEMPERATURE GRADIENT VALUES.                                       ISC09260
      IF(ISW(21) .LT. 1) ISW(21) = 1                                     ISC09270
      IF(ISW(22) .LT. 1) ISW(22) = 1                                     ISC09280
C     DEFAULT TO FINAL PLUME RISE FOR ALL RECEPTORS.                     ISC09290
      IF(ISW(24) .LT. 1) ISW(24) = 1                                     ISC09300
C     DEFAULT TO NO STACK DOWNWASH ADJUSTMENT.                           ISC09310
      IF(ISW(25) .LT. 1) ISW(25) = 1                                     ISC09320
C     READ GRID THEN DISCRETE POINTS                                     ISC09330
C     READ NON-DISCRETE RECEPTOR DATA                                    ISC09340
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 70                       ISC09350
      IF(ISW(2) .NE. 3) READ(IN,9020) (GRIDX(I),I=1,NXPNTS)              ISC09360
      IF(ISW(2).NE.3.AND.ISW(30).EQ.1) THEN                              ISC09370
      WRITE(IO,9520) (GRIDX(I),I=1,NXPNTS)                               ISC09380
      ENDIF                                                              ISC09390
      IF(ISW(2) .LT. 3) READ(IN,9020) (GRIDY(I),I=1,NYPNTS)              ISC09400
      IF(ISW(2).LT.3.AND.ISW(30).EQ.1) THEN                              ISC09410
      WRITE(IO,9520) (GRIDY(I),I=1,NYPNTS)                               ISC09420
      ENDIF                                                              ISC09430
      IF(ISW(2) .NE. 3) GOTO 30                                          ISC09440
      READ(IN,9020) GRIDX(1),DX                                          ISC09450
      IF(ISW(30).EQ.1) THEN                                              ISC09460
      WRITE(IO,9520) GRIDX(1),DX                                         ISC09470
      ENDIF                                                              ISC09480
      I2 = NXPNTS - 1                                                    ISC09490
      DO 20  I = 1,I2                                                    ISC09500
      I1 = I + 1                                                         ISC09510
   20 GRIDX(I1) = GRIDX(I) + DX                                          ISC09520
   30 IF(ISW(2) .LT. 3) GOTO 50                                          ISC09530
      READ(IN,9020) GRIDY(1),DY                                          ISC09540
      IF(ISW(30).EQ.1) THEN                                              ISC09550
      WRITE(IO,9520) GRIDY(1),DY                                         ISC09560
      ENDIF                                                              ISC09570
      I2 = NYPNTS - 1                                                    ISC09580
      DO 40  I = 1,I2                                                    ISC09590
      I1 = I + 1                                                         ISC09600
   40 GRIDY(I1) = GRIDY(I) + DY                                          ISC09610
   50 IF(ISW(2) .NE. 2 .AND. ISW(2) .NE. 4) GOTO 61                      ISC09620
C     SET DEFAULT DIRECTION VALUES.                                      ISC09630
      DO 60 I = 1,NYPNTS                                                 ISC09640
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   60 IF(GRIDY(I) .LE. 0.0 .OR. GRIDY(I) .GT. 360.0) GRIDY(I) = 360.0   ISC09650
   61 IF(ISW(4).EQ.0) GO TO 66                                          ISC09660
C     READ NON-DISCRETE RECEPTOR ELEVATIONS                             ISC09670
      DO 65 J=1,NYPNTS                                                  ISC09680
      I1 = (J-1)*NXPNTS                                                 ISC09690
      I2 = I1 + NXPNTS                                                  ISC09700
      I1 = I1 + 1                                                       ISC09710
      READ(IN,9020) (GRIDZ(I),I=I1,I2)                                  ISC09720
      IF(ISW(30).EQ.1) THEN                                             ISC09730
      WRITE(IO,9520) (GRIDZ(I),I=I1,I2)                                 ISC09740
      ENDIF                                                             ISC09750
 65   CONTINUE                                                          ISC09760
C     READ IN NON-DISCRETE ABOVE GROUND (FLAGPOLE) RECEPTOR HEIGHTS.    ISC09770
   66 IF (ISW(31) .EQ. 0) GO TO 70                                      ISC09780
      DO 67 J=1,NYPNTS                                                  ISC09790
      I1=(J-1)*NXPNTS                                                   ISC09800
      I2=I1 + NXPNTS                                                    ISC09810
      I1 = I1 + 1                                                       ISC09820
      READ(IN,9020) (RHT(I),I=I1,I2)                                    ISC09830
      IF (ISW(30) .EQ. 1) THEN                                          ISC09840
      WRITE(IO,9520) (RHT(I),I=I1,I2)                                   ISC09850
      ENDIF                                                             ISC09860
   67 CONTINUE                                                          ISC09870
   70 IF(NXWYPT .EQ. 0) GOTO 90                                         ISC09880
C     READ ALL DISCRETE RECEPTOR DATA                                   ISC09890
C     IF USER DOES NOT WANT TO CONSIDER RECEPTOR TERRAIN , DO NOT       ISC09900
C     INPUT THE 3RD VARIABLE IN THE FOLLOWING RECORDS.                  ISC09910
C     IF USER DOES NOT WANT TO CONSIDER ABOVE GROUND RECEPTORS, DO      ISC09920
C     NOT INPUT THE LAST VARIABLE IN THE FOLLOWING RECORDS.             ISC09930
      DO 75 I=1,NXWYPT                                                  ISC09940
      I1=I+NXPNTS*NYPNTS                                                ISC09950
C     READ CORRECT DISCRETE VARIABLES INTO STORAGE DEPENDING UPON THE   ISC09960
C     VALUES OF ISW(4) AND ISW(31).                                     ISC09970
      TER = .FALSE.                                                     ISC09980
      IF (ISW(4) .NE. 0) TER = .TRUE.                                   ISC09990
      HGT = .FALSE.                                                     ISC10000
      IF (ISW(31) .NE. 0) HGT = .TRUE.                                  ISC10010
      IF (TER .AND. HGT) THEN                                           ISC10020
      READ(IN,9020) XDIS(I),YDIS(I),GRIDZ(I1),RHT(I1)                   ISC10030
      IF (ISW(30).EQ.1) WRITE(IO,9520) XDIS(I),YDIS(I),GRIDZ(I1),RHT(I1)ISC10040
      ELSEIF (TER) THEN                                                 ISC10050
      READ(IN,9020) XDIS(I),YDIS(I),GRIDZ(I1),DUM                       ISC10060
      IF (ISW(30).EQ.1) WRITE(IO,9520) XDIS(I),YDIS(I),GRIDZ(I1)        ISC10070
      ELSEIF (HGT) THEN                                                 ISC10080
      READ(IN,9020) XDIS(I),YDIS(I),DUM,RHT(I1)                         ISC10090
      IF (ISW(30).EQ.1) WRITE(IO,9520) XDIS(I),YDIS(I),RHT(I1)          ISC10100
      ELSE                                                              ISC10110
      IF (.NOT. TER .AND. .NOT. HGT) READ(IN,9020) XDIS(I),YDIS(I)      ISC10120
      IF (ISW(30).EQ.1) WRITE(IO,9520) XDIS(I),YDIS(I)                  ISC10130
      ENDIF                                                             ISC10140
 75   CONTINUE                                                          ISC10150
      IF(ISW(3) .NE. 2) GOTO 90                                         ISC10160
C     SET DEFAULT DIRECTION VALUES.                                     ISC10170
      DO 80 I = 1,NXWYPT                                                ISC10180
   80 IF(YDIS(I) .LE. 0.0 .OR. YDIS(I) .GT. 360.0) YDIS(I) = 360.0      ISC10190
   90 IF(ISW(4).LE.0) GO TO 125                                         ISC10200
C     READ DISCRETE RECEPTOR ELEVATIONS.                                ISC10210
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C     CHANGE RECEPTOR ELEVATION UNITS(FT TO M)                          ISC10220
      DO 121 I=1,NPNTS                                                  ISC10230
  121 GRIDZ(I) = GRIDZ(I) * .3048006                                    ISC10240
  125 ISW(4) =IABS(ISW(4))                                              ISC10 50
C     READ SOURCE GROUP INFO                                            ISC10260
      IF(NGROUP .EQ. 0) GOTO 140                                        ISC10270
      READ(IN,9023) (NSOGRP(I),I=1,NGROUP)                              ISC10280
      IF(ISW(30).EQ.1) THEN                                             ISC10290
      WRITE(IO,9523) (NSOGRP(I),I=1,NGROUP)                             ISC10300
      ENDIF                                                             ISC10310
      I1 = 0                                                            ISC10320
      DO 130 I = 1,NGROUP                                               ISC10330
  130 I1 = I1 + NSOGRP(I)                                               ISC10340
      READ(IN,9024) (IDSOR(I),I=1,I1)                                   ISC10350
      IF(ISW(30).EQ.1) THEN                                             ISC10360
      WRITE(IO,9524) (IDSOR(I),I=1,I1)                                  ISC10370
      ENDIF                                                             ISC10380
C     DEFAULT OR READ WIND PROFILE EXPONENTS, VERTICAL POTENTIAL        ISC10390
C     TEMPERATURE GRADIENTS.                                            ISC10400
  140 IF(ISW(21).EQ.2) THEN                                             ISC10410
C     CARD WIND PROFILE EXPONENTS ONLY READ IF THE                      ISC10420
C     REGULATORY DEFAULT OPTION IS NOT CHOSEN.                          ISC10430
      DO 150  J = 1,6                                                   ISC10440
      READ(IN,9020)  (PDEF(I,J),I=1,6)                                  ISC10450
      IF(ISW(30).EQ.1) THEN                                             ISC10460
      WRITE(IO,9520) (PDEF(I,J),I=1,6)                                  ISC10470
      ENDIF                                                             ISC10480
  150 CONTINUE                                                          ISC10490
      ELSE                                                              ISC10500
      IF(ISW(20).EQ.0) THEN                                             ISC10510
C     RURAL WIND PROFILE EXPONENTS                                      ISC10520
      DO 154 J=1,6                                                      ISC10530
      DO 154 I=1,6                                                      ISC10540
  154 PDEF(I,J)=PDEFR(J)                                                ISC10550
      ELSE                                                              ISC10560
C     URBAN WIND PROFILE EXPONENTS                                      ISC10570
      DO 156 J=1,6                                                      ISC10580
      DO 156 I=1,6                                                      ISC10590
  156 PDEF(I,J)=PDEFU(J)                                                ISC10600
      ENDIF                                                             ISC10610
      ENDIF                                                             ISC10620
  160 IF(ISW(22) .NE. 2) GOTO 180                                       ISC10630
C     CARD DTHDEF ONLY IF REG. DEFAULT OPTION NOT CHOSEN                ISC10640
      DO 170  J = 1,6                                                   ISC10650
      READ(IN,9020)  (DTHDEF(I,J),I=1,6)                                ISC10660
      IF(ISW(30).EQ.1) THEN                                             ISC10670
      WRITE(IO,9520) (DTHDEF(I,J),I=1,6)                                ISC10680
      ENDIF                                                             ISC10690
  170 CONTINUE                                                          ISC10700
C     ENTER QFLGS AND WIND SPEED CATEGORIES.                            ISC10710
  180 READ(IN,9020) ZR,(UCATS(I),I=1,5)                                 ISC10720
      IF(ISW(30).EQ.1) THEN                                             ISC10730
      WRITE(IO,9520) ZR,(UCATS(I),I=1,5)                                ISC10740
      ENDIF                                                             ISC10750
      DO 190   I = 1,5                                                  ISC10760
      IF(UCATS(I) .GT. 0.0) GOTO 190                                    ISC10770
      UCATS(I) = UCTDEF(I)                                              ISC10780
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  190 CONTINUE                                                          ISC10790
C     READ GENERAL INPUT VARIABLES & SET DEFAULT VALUES.                ISC10800
  200 READ(IN,9021) TK,DDECAY,(IQUN(I),I=1,3),                          ISC10810
     1 (ICHIUN(I),I=1,7),IMET,ITAP                                      ISC10820
      IF(ISW(30).EQ.1) THEN                                             ISC10830
      WRITE(IO,9521) TK,DDECAY,(IQUN(I),I=1,3),                         ISC10840
     X  (ICHIUN(I),I=1,7),IMET,ITAP                                     ISC10850
      ENDIF                                                             ISC10860
C     SET HALF LIFE DEFAULT VALUE OF 4 HOURS (DECAY=                    ISC10870
C     .0000481) IF SO2 IS MODELLED IN AN URBAN MODE WITH                ISC10880
C     THE REGULATORY DEFAULT OPTION.                                    ISC10890
      IF(ISW(28).EQ.1.AND.ISW(29).EQ.1.AND.ISW(20).GT.0)                ISC10900
     X  DDECAY=.0000481                                                 ISC10910
      IF(TK .LE. 0.0 .AND. ISW(1) .EQ. 1) TK = 1.E6                     ISC10920
      IF(TK .LE. 0.0 .AND. ISW(1) .EQ. 2) TK = 1.0                      ISC10930
      IF(IMET .LE. 0 .AND. ISW(19) .EQ. 1) IMET = 9                     ISC10940
      IF(IMET .LE. 0 .AND. ISW(19) .EQ. 2) IMET = IH                    ISC10950
      IF(ITAP .LE. 0) ITAP = 3                                          ISC10960
      IF(ZR .LE. 0.0) ZR = 10.0                                         ISC10970
      DO 210 I = 1,3                                                    ISC10980
      IF(IQUN(I) .NE. IBLANK) GOTO 230                                  ISC10990
  210 CONTINUE                                                          ISC11000
      IF(ISW(1) .EQ. 2) GOTO 220                                        ISC11010
      IQUN(1) = 4H(GRA                                                  ISC11020
      IQUN(2) = 4HMS/S                                                  ISC11030
      IQUN(3) = 4HEC)                                                   ISC11040
      GOTO 230                                                          ISC11050
  220 IQUN(1) = 4H  (G                                                  ISC11060
      IQUN(2) = 4HRAMS                                                  ISC11070
      IQUN(3) = 4H)                                                     ISC11080
  230 DO 240 I = 1,7                                                    ISC11090
      IF(ICHIUN(I) .NE. IBLANK) GOTO 260                                ISC11100
  240 CONTINUE                                                          ISC11110
      IF(ISW(1) .EQ. 2) GOTO 250                                        ISC11120
      ICHIUN(1) = 4H(MIC                                                ISC11130
      ICHIUN(2) = 4HROGR                                                ISC11140
      ICHIUN(3) = 4HAMS/                                                ISC11 50
      ICHIUN(4) = 4HCUBI                                                ISC11160
      ICHIUN(5) = 4HC ME                                                ISC11170
      ICHIUN(6) = 4HTER)                                                ISC11180
      ICHIUN(7) = 4H                                                    ISC11190
      GOTO 260                                                          ISC11200
  250 ICHIUN(1) = 4H(GRA                                                ISC11210
      ICHIUN(2) = 4HMS/S                                                ISC11220
      ICHIUN(3) = 4HQUAR                                                ISC11230
      ICHIUN(4) = 4HE ME                                                ISC11240
      ICHIUN(5) = 4HTER                                                 ISC11250
      ICHIUN(6) = 4H                                                    ISC11260
      ICHIUN(7) = 4H                                                    ISC11270
C     READ 'DAY' ARRAY & MET IDENTIFICATION.                            ISC11280
  260 IF(ISW(19) .NE. 1) GOTO 270                                       ISC11290
      READ(IN,9022) (IDAY(I),I=1,366)                                   ISC11300
      IF(ISW(30).EQ.1) THEN                                             ISC11310
      WRITE(IO,9522) (IDAY(I),I=1,366)                                  ISC11320
      ENDIF                                                             ISC11330
      READ(IN,9024) ISS,ISY,IUS,IUY                                     ISC11340
      IF(ISW(30).EQ.1) THEN                                             ISC11350
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      WRITE(IO,9524) ISS,ISY,IUS,IUY                                    ISC11360
      ENDIF                                                             ISC11370
      NDAYS = 365                                                       ISC11380
      IF(MOD(ISY,4) .EQ. 0) NDAYS = 366                                 ISC11390
      READ(IMET) ISSI,ISYI,IUSI,IUYI                                    ISC11400
      IF(ISS.EQ.ISSI.AND.ISY.EQ.ISYI.AND.IUS.EQ.IUSI.AND.IUY.EQ.IUYI)   ISC11410
     1 GOTO 280                                                         ISC11420
      WRITE(IO,9025) ISS,ISSI,ISY,ISYI,IUS,IUSI,IUY,IUYI                ISC11430
      STOP                                                              ISC11440
C     FOR CARD MET DATA SET RURAL-URBAN SWITCH TO RURAL                 ISC11450
C     EXCEPT IF URBAN MODE 3 IS USED                                    ISC11460
  270   IF (ISW(20) .NE. 3) ISW(20)=0                                   ISC11470
  280 IF(NSOURC .GT. 0) GOTO 290                                        ISC11480
      WRITE(IO,9026)                                                    ISC11490
      STOP                                                              ISC11500
C*                                                                      ISC11510
C     READ SOURCE DATA.                                                 ISC11520
C     MOST VARIABLES ARE READ DIRECTLY INTO THE 'SOURCE' ARRAY WHICH    ISC11530
C     HAS 215 STORAGE LOCATIONS ALLOCATED PER SOURCE.  STORAGE LOCATION ISC11540
C     1 CONTAINS WAKE, QFLG, NVS & ITYPE PACKED INTO THE FIRST LOCATION.ISC11550
C     STORAGE LOCATIONS 2-13 CONTAIN:  NSO, Q, X, Y, ZS, HS  TS OR      ISC11560
C     SIGZO, VS OR SIGYO OR XO, D, HB, BUILDING LENGTH, AND BUILDING    ISC11570
C     WIDTH, RESPECTIVELY.  STORAGE LOCATIONS 16-35 CONTAIN PHI, 36-55  ISC11580
C     CONTAIN SETTLING VELOCITIES AND 56-75 CONTAIN GAMMA.  STORAGE     ISC11590
C     LOCATIONS 76-81 CONTAIN STABILITY-DEPENDENT LATERAL VIRTUAL       ISC11600
C     DISTANCES AND LOCATIONS 82-117 CONTAIN STABILITY AND XBAR-        ISC11610
C     DEPENDENT VERTICAL VIRTUAL DISTANCES BOTH OF WHICH ARE COMPUTED   ISC11620
C     IN SUBROUTINE MODEL.  STORAGE LOCATIONS 120-215 CONTAIN Q         ISC11630
C     ADJUSTMENT FACTORS AS A FUNCTION OF EITHER TIME OF DAY-SEASONAL   ISC11640
C     OR STABILITY-WIND SPEED VARIATIONS. STORAGE LOCATIONS 216-251     ISC11650
C     CONTAIN DIRECTION SPECIFIC BUILDING HEIGHTS AND STORAGE LOCATIONS ISC11660
C     252-287 CONTAIN DIRECTION SPECIFIC BUILDING WIDTHS.               ISC11670
C       STORAGE LOCATIONS 14 AND 15 ARE CURRENTLY NOT BEING USED.       ISC11680
C     8/85  STORAGE LOCATIONS 118 AND 119 ARE NOW BEING USED TO         ISC11690
C     ALLOW FOR CALCULATIONS WHEN SOURCE-RECEPTOR DISTANCES             ISC11700
C     ARE LESS THAN 100M.                                               ISC11710
C                                                                       ISC11720
  290 II = 1                                                            ISC11730
  300 IF(II .GT. NSOURC) GOTO 320                                       ISC11740
      READ(IN,9027) NSO,ITYPE,WAKE,NVS,QFLG,(SOURCE(I,II),I=3,13)       ISC11750
      IF (ISW(30).EQ.1) WRITE(IO,9526) NSO,ITYPE,WAKE,NVS,QFLG,         ISC11760
     1  (SOURCE(I,II),I=3,13)                                           ISC11770
      IF(NVS .LE. 0) GOTO 310                                           ISC11780
C     INPUT VARIABLES RELATED TO PARTICULATE SOURCES.                   ISC11790
      READ(IN,9020) (SOURCE(15+I,II),I=1,NVS)                           ISC11800
      IF (ISW(30).EQ.1) WRITE(IO,9520) (SOURCE(15+I,II),I=1,NVS)        ISC11810
      READ(IN,9020) (SOURCE(35+I,II),I=1,NVS)                           ISC11820
      IF (ISW(30).EQ.1) WRITE(IO,9520) (SOURCE(35+I,II),I=1,NVS)        ISC11830
      READ(IN,9020) (SOURCE(55+I,II),I=1,NVS)                           ISC11840
      IF (ISW(30).EQ.1) WRITE(IO,9520) (SOURCE(55+I,II),I=1,NVS)        ISC11850
  310 CONTINUE                                                          ISC11860
C     CALC EFFECT BLDG WIDTH TO DETERMINE IF DIRECT. SPEC. WILL BE USED ISC11870
C     2/SQRT(3.14159265) = 1.1283792                                    ISC11880
      SOURCE(12,II) = 1.1283792*SQRT(SOURCE(12,II)*SOURCE(13,II))       ISC11890
C     READ DIRECTION SPECIFIC BUILDING DIMENSIONS                       ISC11900
      RL = SOURCE(12,II)                                                ISC11910
      IF (ABS(SOURCE(11,II)) .LT. SOURCE(12,II)) RL = ABS(SOURCE(11,II))ISC11920
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      IF (SOURCE(11,II) .EQ. 0.0) GOTO 315                              ISC11930
      IF (ISW(28) .EQ. 2 .AND. SOURCE(11,II) .GT. 0.0) GOTO 315         ISC11 40
      IF (SOURCE(7,II) .GT. (ABS(SOURCE(11,II))+0.5*RL)) THEN           ISC11950
C     PRINT WARNING MESSAGE TO USER IF NOT USING DIR. SPEC. BLDG. DIM.  ISC11960
      IF (SOURCE(11,II) .LT. 0.0) THEN                                  ISC11970
      WRITE(IO,9063) NSO                                                ISC11980
      READ(IN,9066)                                                     ISC11990
      ENDIF                                                             ISC12000
      SOURCE(11,II) = ABS(SOURCE(11,II))                                ISC12010
      GOTO 315                                                          ISC12020
      ENDIF                                                             ISC12030
      SOURCE(11,II) = -(ABS(SOURCE(11,II)))                             ISC12040
      IF (SOURCE(11,II) .LT. 0.) THEN                                   ISC12050
      READ(IN,9525) (SOURCE(215+I,II),I=1,36)                           ISC12060
      IF (ISW(30).EQ.1) WRITE(IO,9520) (SOURCE(215+I,II),I=1,36)        ISC12070
      READ(IN,9525) (SOURCE(251+I,II),I=1,36)                           ISC12080
      IF (ISW(30).EQ.1) WRITE(IO,9520) (SOURCE(251+I,II),I=1,36)        ISC12090
      ENDIF                                                             ISC12100
C     PACK SOURCE VARIABLES WAKE, QFLG, NVS & ITYPE INTO FIRST LOCATION.ISC12110
C     ALSO STORE SOURCE NUMBER.                                         ISC12120
  315 SOURCE(1,II) = ITYPE + NVS*16 + QFLG*512 + WAKE*8192              ISC12130
      SOURCE(2,II) = NSO                                                ISC12140
      II = II + 1                                                       ISC12150
      GOTO 300                                                          ISC12160
C     ENTER SOURCE EMISSION RATE SCALARS.                               ISC12170
  320 II = 1                                                            ISC12180
      IF(QFLGS .LT. 1 .OR. QFLGS .GT. 5) GOTO 330                       ISC12190
      DONE = .TRUE.                                                     ISC12200
      QFLG = QFLGS                                                      ISC12210
      GOTO 350                                                          ISC12220
  330 DONE = .FALSE.                                                    ISC12230
  340 IF(II .GT. NSOURC) GOTO 430                                       ISC12240
      ITYPE = SOURCE(1,II)                                              ISC12250
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                ISC12260
      IF(QFLG .LT. 1 .OR. QFLG .GT. 5) GOTO 420                         ISC12270
  350 J = 1                                                             ISC12280
      I = 4                                                             ISC12290
      GOTO (400,360,370,380,390), QFLG                                  ISC12300
  360 I = 12                                                            ISC12310
      GOTO 400                                                          ISC12320
  370 I = 24                                                            ISC12330
      GOTO 400                                                          ISC12340
  380 J = 6                                                             ISC12350
      I = 6                                                             ISC12360
      GOTO 400                                                          ISC12370
  390 J = 4                                                             ISC12380
      I = 24                                                            ISC12390
  400 DO 410 II = 1,J                                                   ISC12400
      IFR = (II-1)*I + 120                                              ISC12410
      ITO = IFR + I - 1                                                 ISC12420
      READ(IN,9020) (SOURCE(I2,II),I2=IFR,ITO)                          ISC12430
  410 CONTINUE                                                          ISC12440
      IF(DONE) GOTO 430                                                 ISC12450
  420 II = II + 1                                                       ISC12460
      GOTO 340                                                          ISC12470
C     LIST ALL INPUT VARIABLES IF DESIRED.                              ISC12480
  430 IF(ISW(6) .LE. 0) GOTO 820                                        ISC12490
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      WRITE(IO,9029) (TITLE(I),I=1,15)                                  ISC12500
      WRITE(IO,9030) (ISW(I),I=1,14)                                    ISC12510
      WRITE(IO,9031) (ISW(I),I=15,26)                                   ISC12520
      WRITE(IO,9061) (ISW(I),I=27,31)                                   ISC12530
      WRITE(IO,9032) NSOURC,NGROUP,IPERD,NXPNTS,NYPNTS,NXWYPT           ISC12540
      IF(ISW(19) .EQ. 2) WRITE(IO,9033) NHOURS,NDAYS                    ISC12550
      WRITE(IO,9034) TK,ZR,IMET                                         ISC12560
      IF(ISW(19) .NE. 1) GOTO 440                                       ISC12570
      WRITE(IO,9035) DDECAY,ISS,ISY,IUS,IUY                             ISC12580
  440 CONTINUE                                                          ISC12590
      IF(ISW(5) .GT. 0) WRITE(IO,9036) ITAP                             ISC12600
      WRITE(IO,9056) LIMIT,MIMIT                                        ISC12610
      WRITE(IO,9029) (TITLE(I),I=1,15)                                  ISC12620
      LINE = 6                                                          ISC12630
      IF(ISW(19) .NE. 1) GOTO 450                                       ISC12640
C     PRINT 'DAY' ARRAY.                                                ISC12650
      LINE = 18                                                         ISC12660
      WRITE(IO,9037) (IDAY(I),I=1,366)                                  ISC12670
  450 IF(NGROUP .EQ. 0) GOTO 470                                        ISC12680
C     PRINT SOURCE GROUP INFO.                                          ISC12690
      LINE = LINE + 12                                                  ISC12700
      WRITE(IO,9057) (NSOGRP(I),I=1,NGROUP)                             ISC12710
      I3 = 0                                                            ISC12720
      DO 460 I = 1,NGROUP                                               ISC12730
  460 I3 = I3 + NSOGRP(I)                                               ISC12740
      WRITE(IO,9058) (IDSOR(I),I=1,I3)                                  ISC12750
C     PRINT UPPER BOUND OF FIRST 5 WIND SPEED CATEGORIES.               ISC12760
  470 LINE = LINE + 6                                                   ISC12770
      WRITE(IO,9001) (UCATS(I),I=1,5)                                   ISC12780
      IF(ISW(19).EQ.2.AND.ISW(6).EQ.2) GOTO 530                         ISC12790
      IF(ISW(21) .EQ. 3) GOTO 500                                       ISC12800
C     PRINT WIND PROFILE EXPONENTS.                                     ISC12810
      LINE = LINE + 12                                                  ISC12820
      IF(LINE .LT. 57) GOTO 480                                         ISC12830
      LINE = 15                                                         ISC12840
      WRITE(IO,9029) TITLE                                              ISC12850
  480 WRITE(IO,9059)                                                    ISC12860
      WRITE(IO,9016) (I1,I1=1,6)                                        ISC12870
      DO 490  I = 1,6                                                   ISC12880
  490 WRITE(IO,9017) ATHRUF(I),(PDEF(J,I),J=1,6)                        ISC12890
  500 IF(ISW(22) .EQ. 3) GOTO 530                                       ISC12900
C     PRINT VERTICAL POTENTIAL TEMPERATURE GRADIENTS.                   ISC12910
      LINE = LINE + 12                                                  ISC12920
      IF(LINE .LT. 57) GOTO 510                                         ISC12930
      LINE = 15                                                         ISC12940
      WRITE(IO,9029) TITLE                                              ISC12950
  510 WRITE(IO,9060)                                                    ISC12960
      WRITE(IO,9016) (I1,I1=1,6)                                        ISC12970
      DO 520  I = 1,6                                                   ISC12980
  520 WRITE(IO,9017) ATHRUF(I),(DTHDEF(J,I),J=1,6)                      ISC12990
C     PRINT RECEPTOR INFO.                                              ISC13000
  530 IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 550                     ISC13010
      LINE = LINE + 20                                                  ISC13020
      IF(LINE .LT. 57) GOTO 540                                         ISC13030
      LINE = 6                                                          ISC13040
      WRITE(IO,9029) TITLE                                              ISC13050
  540 IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9038)               ISC13060
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      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9039)                ISC13070
      WRITE(IO,9040) (GRIDX(I),I=1,NXPNTS)                               ISC13080
      IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9041)                ISC13090
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9042)                ISC13100
      WRITE(IO,9040) (GRIDY(I),I=1,NYPNTS)                               ISC13110
  550 IF(NXWYPT .EQ. 0) GOTO 570                                         ISC13120
      LINE = LINE + 5 + NXWYPT/5                                         ISC13130
      IF(LINE .LT. 57) GOTO 560                                          ISC13140
      LINE = 6                                                           ISC13150
      WRITE(IO,9029) TITLE                                               ISC13160
  560 IF(ISW(3) .EQ. 1) WRITE(IO,9043)                                   ISC13170
      IF(ISW(3) .EQ. 2) WRITE(IO,9044)                                   ISC13180
      WRITE(IO,9045) (XDIS(I),YDIS(I),I=1,NXWYPT)                        ISC13190
C     PRINT TERRAIN HEIGHTS.                                             ISC13200
  570 IF(ISW(4) .NE. 1) GOTO 575                                         ISC13210
      CONDEP(3) = 4HELEV                                                 ISC13220
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,GRIDZ,99,IDY,IHR,1,0,0,0)         ISC13230
C     PRINT THE RECEPTOR HEIGHTS ABOVE GROUND                            ISC13240
  575 IF (ISW(31) .NE. 1) GOTO 580                                       ISC13250
      CONDEP(3) = 4HHGT                                                  ISC13260
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,RHT,99,IDY,IHR,-1,0,0,0)          ISC13270
C     PRINT OUT SOURCE INFO.                                             ISC13280
  580 CONTINUE                                                           ISC13290
      LINE = 100                                                         ISC13300
      I3 = 0                                                             ISC13310
      DO 600 I = 1,NSOURC                                                ISC13320
      IF(LINE .LE. 56) GOTO 590                                          ISC13330
      WRITE(IO,9029) (TITLE(J),J=1,15)                                   ISC13340
      WRITE(IO,9046) ((IQUN(J),J=1,3),I2=1,2),(METER(1),METER(2),J=1,10)ISC13350
      LINE = 16                                                          ISC13360
  590 CONTINUE                                                           ISC13370
      ITYPE = SOURCE(1,I)                                                ISC13380
C     GET WAKE OPTION, SOURCE NO., NVS & TYPE FROM FIRST WORD.           ISC13390
      NSO = SOURCE(2,I)                                                  ISC13400
      WAKE = ITYPE/8192                                                  ISC13410
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                 ISC13420
      NVS = ITYPE/16 - (ITYPE/512)*32                                    ISC13430
      ITYPE = ITYPE - (ITYPE/16)*16                                      ISC13440
      IF(NVS .GT. 0) I3 = 1                                              ISC13450
C     CONVERT EFFECTIVE BUILDING WIDTH BACK TO LENGTH FOR ECHO OF INPUT  ISC13460
      SOURCE(12,I) = (SOURCE(12,I)/1.1283792)**2/SOURCE(13,I)            ISC13470
      WRITE(IO,9047) NSO,ITYPE,WAKE,NVS,(SOURCE(J,I),J=3,13)             ISC13480
C     RECALCULATE EFFECTIVE BUILDING WIDTH FOR ALL SOURCES & STORE IN    ISC13490
C     LOCATION 12 OF 'SOURCE' ARRAY.  BUILDING LENGTH & WIDTH WILL NO    ISC13500
C     LONGER BE NEEDED.                                                  ISC13510
      SOURCE(12,I) = 1.1283792*SQRT(SOURCE(12,I)*SOURCE(13,I))           ISC13520
      LINE = LINE + 1                                                    ISC13530
  600 CONTINUE                                                           ISC13540
      IF(I3 .NE. 1) GOTO 625                                             ISC13550
C     PRINT OUT PARTICLE CATEGORY INFORMATION.                           ISC13560
      LINE = 100                                                         ISC13570
      DO 620 I = 1,NSOURC                                                ISC13580
      IF(LINE .LT. 43) GOTO 610                                          ISC13590
      WRITE(IO,9029) (TITLE(J),J=1,15)                                   ISC13600
      WRITE(IO,9049)                                                     ISC13610
      LINE = 10                                                          ISC13620
  610 CONTINUE                                                           ISC13630
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      ITYPE = SOURCE(1,I)                                                ISC13640
      NSO = SOURCE(2,I)                                                  ISC13650
      NVS = ITYPE/16 - (ITYPE/512)*32                                    ISC13660
      IF(NVS .LE. 0) GOTO 620                                            ISC13670
      WRITE(IO,9050) NSO                                                 ISC13680
      I2 = 15 + NVS                                                      ISC13690
      WRITE(IO,9051)  (SOURCE(J,I),J=16,I2)                              ISC13700
      I2 = 35 + NVS                                                      ISC13710
      WRITE(IO,9052)  (SOURCE(J,I),J=36,I2)                              ISC13720
      I2 = 55 + NVS                                                      ISC13730
      WRITE(IO,9053) (SOURCE(J,I),J=56,I2)                               ISC13740
      LINE = LINE + 14                                                   ISC13750
  620 CONTINUE                                                           ISC13760
  625 LINE=100                                                           ISC13770
C     WRITE OUT DIRECTION SPECIFIC BLDG. DIMENSIONS, IF PRESENT          ISC13780
      DO 630 I=1,NSOURC                                                  ISC13790
      IF (SOURCE(11,I) .LT. 0.) THEN                                     ISC13800
      ITYPE=SOURCE(1,I)                                                  ISC13810
      ITYPE=ITYPE-(ITYPE/16)*16                                          ISC13820
      IF (ITYPE .EQ. 0) THEN                                             ISC13830
      IF (LINE .GT. 44) THEN                                             ISC13840
C     RESET LINE AND START A NEW PAGE                                    ISC13850
      LINE=0                                                             ISC13860
      WRITE(IO,9029) TITLE                                               ISC13870
      WRITE(IO,9064)                                                     ISC13880
      ENDIF                                                              ISC13890
C     SET SWITCH FOR TYPE OF BLDG. DOWNWASH MODIFICATIONS                ISC13900
      DO 627 J=1,36                                                      ISC13910
      IWAKSW(J)=0                                                        ISC13920
      IF (SOURCE(215+J,I) .LT. 0.) IWAKSW(J)=1                           ISC13930
  627 CONTINUE                                                           ISC13940
      WRITE(IO,9062) I,(J,ABS(SOURCE(215+J,I)),SOURCE(251+J,I),          ISC13950
     1 IWAKSW(J),J=1,36)                                                 ISC13960
      LINE = LINE + 10                                                   ISC13970
      ENDIF                                                              ISC13980
      ENDIF                                                              ISC13990
  630 CONTINUE                                                           ISC14000
C     PRINT SOURCE EMISSION RATE SCALARS.                                ISC14010
      I = 1                                                              ISC14020
      IF(QFLGS .LT. 1 .OR. QFLGS .GT. 5) GOTO 640                        ISC14030
      DONE = .TRUE.                                                      ISC14040
      QFLG = QFLGS                                                       ISC14050
      LINE = 100                                                         ISC14060
      GOTO 670                                                           ISC14070
  640 DONE = .FALSE.                                                     ISC14080
      J = 1                                                              ISC14090
  650 IF(J .GT. 5) GOTO 820                                              ISC14100
      LINE = 100                                                         ISC14110
      I = 1                                                              ISC14120
  660 IF(I .GT. NSOURC) GOTO 810                                         ISC14130
      ITYPE = SOURCE(1,I)                                                ISC14140
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                 ISC14150
      IF(QFLG .NE. J) GOTO 800                                           ISC14160
      NSO = SOURCE(2,I)                                                  ISC14170
  670 GOTO (680,700,720,740,770), QFLG                                   ISC14180
  680 IF(LINE .LT. 54) GOTO 690                                          ISC14190
      WRITE(IO,9029) TITLE                                               ISC14200
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      WRITE(IO,9002)                                                    ISC14210
      IF(DONE) WRITE(IO,9003)                                           ISC14220
      WRITE(IO,9004) ((SEASON(I1,I2),I1=1,2),I2=1,4)                    ISC14230
      LINE = 14                                                         ISC14240
  690 IF(.NOT.DONE) WRITE(IO,9005) NSO                                  ISC14250
      WRITE(IO,9006) (SOURCE(I1,I),I1=120,123)                          ISC14260
      IF(DONE) GOTO 820                                                 ISC14270
      LINE = LINE + 3                                                   ISC14280
      GOTO 800                                                          ISC14290
  700 IF(LINE .LT. 54) GOTO 710                                         ISC14300
      WRITE(IO,9029) TITLE                                              ISC14310
      WRITE(IO,9007)                                                    ISC14320
      IF(DONE) WRITE(IO,9003)                                           ISC14330
      WRITE(IO,9008)                                                    ISC14340
      WRITE(IO,9013)                                                    ISC14350
      LINE = 14                                                         ISC14360
  710 IF(.NOT. DONE) WRITE(IO,9009) NSO                                 ISC14370
      WRITE(IO,9010) (SOURCE(I1,I),I1=120,131)                          ISC14380
      IF(DONE) GOTO 820                                                 ISC14390
      LINE = LINE + 3                                                   ISC14400
      GOTO 800                                                          ISC14410
  720 IF(LINE .LT. 50) GOTO 730                                         ISC14420
      WRITE(IO,9029) TITLE                                              ISC14430
      WRITE(IO,9011)                                                    ISC14440
      IF(DONE) WRITE(IO,9003)                                           ISC14450
      WRITE(IO,9012)                                                    ISC14460
      WRITE(IO,9013)                                                    ISC14470
      LINE = 14                                                         ISC14480
  730 IF(.NOT.DONE) WRITE(IO,9009) NSO                                  ISC14490
      WRITE(IO,9014) (I1,SOURCE(119+I1,I),I1=1,24)                      ISC14500
      IF(DONE) GOTO 820                                                 ISC14510
      LINE = LINE + 7                                                   ISC14520
      GOTO 800                                                          ISC14530
  740 IF(LINE .LT. 49) GOTO 750                                         ISC14540
      WRITE(IO,9029) TITLE                                              ISC14550
      WRITE(IO,9015)                                                    ISC14560
      IF(DONE) WRITE(IO,9003)                                           ISC14570
      WRITE(IO,9016) (I1,I1=1,6)                                        ISC14580
      WRITE(IO,9013)                                                    ISC14590
      LINE = 16                                                         ISC14600
  750 IF(.NOT.DONE) WRITE(IO,9009) NSO                                  ISC14610
      DO 760  I1 = 1,6                                                  ISC14620
      IFR = (I1-1)*6 + 120                                              ISC14630
      ITO = IFR + 5                                                     ISC14640
  760 WRITE(IO,9017) ATHRUF(I1),(SOURCE(I2,I),I2=IFR,ITO)               ISC14650
      IF(DONE) GOTO 820                                                 ISC14660
      LINE = LINE + 8                                                   ISC14670
      GOTO 800                                                          ISC14680
  770 IF(LINE .LT. 37) GOTO 780                                         ISC14690
      WRITE(IO,9029) TITLE                                              ISC14700
      WRITE(IO,9018)                                                    ISC14710
      IF(DONE) WRITE(IO,9003)                                           ISC14720
      WRITE(IO,9012)                                                    ISC14730
      WRITE(IO,9013)                                                    ISC14740
      LINE = 14                                                         ISC14750
  780 IF(.NOT.DONE) WRITE(IO,9009) NSO                                  ISC14760
      DO 790  I1 = 1,4                                                  ISC14770
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      IFR = (I1-1)*24 + 119                                                 ISC14780
      WRITE(IO,9019) SEASON(1,I1),SEASON(2,I1)                              ISC14790
  790 WRITE(IO,9014) (I2,SOURCE(I2+IFR,I),I2=1,24)                          ISC14800
      IF(DONE) GOTO 820                                                     ISC14810
      LINE = LINE + 22                                                      ISC14820
  800 I = I + 1                                                             ISC14830
      GOTO 660                                                              ISC14840
  810 J = J + 1                                                             ISC14850
      GOTO 650                                                              ISC14860
  820 CONTINUE                                                              ISC14870
      ZR = 1./ZR                                                            ISC14880
C     ALSO, RELOCATE AREA SOURCE COORDINATES FROM THE SOUTHWEST CORNER      ISC14890
C     TO THE CENTER OF THE AREA SOURCE.                                     ISC14900
      DO 830 I = 1,NSOURC                                                   ISC14910
      ITYPE = SOURCE(1,I)                                                   ISC14920
      IF(ITYPE-(ITYPE/16)*16 .NE. 2) GOTO 830                               ISC14930
      A1 = .5*SOURCE(9,I)                                                   ISC14940
      SOURCE(4,I) = SOURCE(4,I) + A1                                        ISC14950
      SOURCE(5,I) = SOURCE(5,I) + A1                                        ISC14960
  830 CONTINUE                                                              ISC14970
C     SET HEADING.                                                          ISC14980
      IF(ISW(1) .EQ. 1) GOTO 840                                            ISC14990
      CONDEP(1) = 4H  TO                                                    ISC15000
      CONDEP(2) = 4HTAL                                                     ISC15010
      CONDEP(3) = 4HDEPO                                                    ISC15020
      CONDEP(4) = 4HSITI                                                    ISC15030
      CONDEP(5) = 4HON                                                      ISC15040
      CONDEP(6) = 4H                                                        ISC15050
      GOTO 850                                                              ISC15060
  840 CONDEP(1) = 4HAVER                                                    ISC15070
      CONDEP(2) = 4HAGE                                                     ISC15080
      CONDEP(3) = 4HCONC                                                    ISC15090
      CONDEP(4) = 4HENTR                                                    ISC15100
      CONDEP(5) = 4HATIO                                                    ISC15110
      CONDEP(6) = 4HH                                                       ISC15120
  850 CONTINUE                                                              ISC15130
      RETURN                                                                ISC15140
 9001 FORMAT(/34X,64H*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CISC15150
     1ATEGORIES ***/60X,12H(METERS/SEC)//46X,5(F7.2,1H,))                   ISC15160
 9002 FORMAT(39X,54H* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLYISC15170
     1 *//)                                                                 ISC15180
 9003 FORMAT(56X,19H* FOR ALL SOURCES *//)                                  ISC15190
 9004 FORMAT(40X,4(2A4,7X)/20X,40(2H- )/)                                   ISC15200
 9005 FORMAT(/20X,12HSOURCE NO. =,I6)                                       ISC15210
 9006 FORMAT(38X,4(E10.5,5X))                                               ISC15220
 9007 FORMAT(41X,51H* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY * ISC15230
     1 //)                                                                  ISC15240
 9008 FORMAT(7X,51HJANUARY  FEBRUARY   MARCH     APRIL      MAY        , ISC15250
     1 58HJUNE      JULY     AUGUST   SEPTEMBER  OCTOBER  NOVEMBER  ,    ISC15260
     2  8HDECEMBER/)                                                       ISC15270
 9009 FORMAT(/13H SOURCE NO. =,I6)                                          ISC15280
 9010 FORMAT(5X,12E10.4)                                                    ISC15290
 9011 FORMAT(32X,68H* SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HISC15300
     1OUR OF THE DAY *//)                                                   ISC15310
 9012 FORMAT(5X,6(14HHOUR    SCALAR,6X))                                    ISC15320
 9013 FORMAT(1X,65(2H- )/)                                                  ISC15330
 9014 FORMAT(4(5X,6(I3,3X,E10.5,4X)/))                                      ISC15340
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9015 FORMAT(30X,73H* SOURCE EMISSION RATE SCALARS WHICH VARY WITH STABIISC15350
    1LITY AND WIND SPEED *//)                                          ISC15360
9016 FORMAT(16X,9HSTABILITY,29X,19HWIND SPEED CATEGORY/16X,8HCATEGORY, ISC15370
    1 9X,6(I1,14X))                                                    ISC15380
9017 FORMAT(19X,A1,5X,6(5X,E10.5))                                     ISC15390
9018 FORMAT(32X,68H* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLYISC15400
    1 AND DIURNALLY *//)                                               ISC15410
9019 FORMAT(59X,9HSEASON = ,2A4)                                       ISC15420
9020 FORMAT(8F10.0)                                                    ISC15430
9021 FORMAT(E8.0,1F8.0,3A4,7A4,2I2)                                    ISC15440
9022 FORMAT(80I1)                                                      ISC15450
9023 FORMAT(20I4)                                                      ISC15460
9024 FORMAT(13I6)                                                      ISC15470
9025 FORMAT(1H1,10X,63H*** ERROR ***  MET DATA REQUESTED DOES NOT MATCHISC15480
    1 MET DATA READ./10X,28H'REQUESTED/READ' VALUES ARE:/10X,          ISC15490
    2 21HSURFACE STATION NO. =,I6,1H/,I6,23H YEAR OF SURFACE DATA =,I6,ISC15500
    3 1H/,I6/10X,23HUPPER AIR STATION NO. =,I6,1H/,I6,                 ISC15510
    4 25H YEAR OF UPPER AIR DATA =,I6,1H/,I6/10X,15HRUN TERMINATED.)   ISC15520
9026 FORMAT(1H1,10X,73H*** ERROR ***  NUMBER OF SOURCES TO BE READ EQUAISC15530
    1LS ZERO.  RUN TERMINATED.)                                        ISC15540
9027 FORMAT(I5,2I1,I2,I1,E8.0,2F7.0,8F6.0)                             ISC15550
9028 FORMAT(9X,I1,3F10.0)                                              ISC15560
9029 FORMAT(1H1/32X,4H*** ,15A4,4H ***/)                               ISC15570
9030 FORMAT(10X,40HCALCULATE (CONCENTRATION=1,DEPOSITION=2),29X,       ISC15580
    1 'HISW(1) =,I4/18X,55HRECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POISC15590
    2LAR=2 OR 4),14X,8HISW(2) =,I4/                                    ISC15600
    3 18X,48HDISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2),21X,     ISC15610
    4 8HISW(3) =,I4/,18X,40HTERRAIN ELEVATIONS ARE READ (YES=1,NO=0),  ISC15620
    5 29X,8HISW(4) =,I4/,18X,                                          ISC15630
    6 45HCALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0),24X,8HISW(5) =, ISC15640
    7 I4/18X,                                                          ISC15650
    8 48HLIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2),21X,         ISC15660
    9 8HISW(6) =,I4//18X,39HCOMPUTE AVERAGE CONCENTRATION (OR TOTAL,   ISC15670
    O 12H DEPOSITION)/18X,32HWITH THE FOLLOWING TIME PERIODS:/20X,     ISC15680
    1 19HHOURLY (YES=1,NO=0),48X,8HISW(7) =,I4/20X,                    ISC15690
    2 19H2-HOUR (YES=1,NO=0),48X,8HISW(8) =,I4/20X,                    ISC15700
    3 19H3-HOUR (YES=1,NO=0),48X,8HISW(9) =,I4/20X,                    ISC15710
    4 19H4-HOUR (YES=1,NO=0),47X,9HISW(10) =,I4/20X,                   ISC15720
    5 19H6-HOUR (YES=1,NO=0),47X,9HISW(11) =,I4/20X,                   ISC15730
    6 19H8-HOUR (YES=1,NO=0),47X,9HISW(12) =,I4/20X,                   ISC15740
    7 20H12-HOUR (YES=1,NO=0),46X,9HISW(13) =,I4/20X,                  ISC15750
    8 20H24-HOUR (YES=1,NO=0),46X,9HISW(14) =,I4)                      ISC15760
9031 FORMAT(10X,35HPRINT 'N'-DAY TABLE(S) (YES=1,NO=0),33X,            ISC15770
    1 9HISW(15) =,I4//18X,58HPRINT THE FOLLOWING TYPES OF TABLES WHOSE ISC15780
    2TIME PERIODS ARE/18X,36HSPECIFIED BY ISW(7) THROUGH ISW(14):/20X, ISC15790
    3 25HDAILY TABLES (YES=1,NO=0),41X,9HISW(16) =,I4/20X,             ISC15800
    4 44HHIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0),22X,9HISW(17) =, ISC15810
    5 I4/20X,30HMAXIMUM 50 TABLES (YES=1,NO=0),36X,9HISW(18) =,I4/18X, ISC15820
    6 57HMETEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2),11X,ISC15830
    7 9HISW(19) =,I4/18X,65HRURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. ISC15840
    *MODE 2=2,UR. MODE 3=3),                                           ISC15850
    8                  3X,9HISW(20) =,I4/18X,57HWIND PROFILE EXPONENT VAISC15860
    9LUES (DEFAULTS=1,USER ENTERS=2,3),11X,9HISW(21) =,I4/18X,         ISC15870
    O 64HVERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,ISC15880
    13),4X,9HISW(22) =,I4/18X,49HSCALE EMISSION RATES FOR ALL SOURCES (ISC15890
    2NO=0,YES>0),19X,9HISW(23) =,I4/18X,53HPROGRAM CALCULATES FINAL PLUISC15900
    3ME RISE ONLY (YES=1,NO=2),15X,9HISW(24) =,I4/18X,                 ISC15910
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     4 59HPROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1),  ISC15920
     5  9X,9HISW(25) =,I4/18X                                          ISC15930
     6  ,'PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)',      ISC15940
     7  15X,'ISW(26) =',I4)                                            ISC15950
 9061 FORMAT(18X,'CONCENTRATIONS DURING CALM PERIODS SET'              ISC15960
     1 ,' = 0 (YES=1,NO=2)',13X,'ISW(27) =',I4/18X,                    ISC15970
     2 'REG. DEFAULT OPTION CHOSEN (YES=1,NO=2)',29X,                  ISC15980
     3 'ISW(28) =',I4/18X,                                             ISC15990
     4  'TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)',            ISC16000
     5  20X,'ISW(29) =',I4/18X,                                        ISC16010
     6  'DEBUG OPTION CHOSEN (YES=1,NO=2)',36X,'ISW(30) =',I4/18X,     ISC16020
     7  'ABOVE GROUND (FLAGPOLE) RECEPTORS USED (YES=1,NO=0)',17X,'ISW(3ISC16030
     81) =',I4)                                                        ISC16040
 9032 FORMAT(/18X,23HNUMBER OF INPUT SOURCES,46X,6HNSOURC =,I4/18X,    ISC16050
     1 40HNUMBER OF SOURCE GROUPS (=0,ALL SOURCES),29X,8HNGROUP =,I4/18XISC16060
     2,53HTIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS),17X,   ISC16070
     3 7HIPERD =,I4/18X,31HNUMBER OF X (RANGE) GRID VALUES,38X,8HNXPNTS ISC16080
     4=,I4/18X,31HNUMBER OF Y (THETA) GRID VALUES,38X,8HNYPNTS =,I4/18X,ISC16090
     5 28HNUMBER OF DISCRETE RECEPTORS,41X,8HNOWYPT =,I4)              ISC16100
 9033 FORMAT(18X,46HNUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA,23X, ISC16110
     1 6HNHOURS =,I4/18X,37HNUMBER OF DAYS OF METEOROLOGICAL DATA,32X,  ISC16120
     2 6H NDAYS =,I4)                                                  ISC16130
 9034 FORMAT(18X,44HSOURCE EMISSION RATE UNITS CONVERSION FACTOR,27X,   ISC16140
     1 6H  TK =,E10.5/18X,                                             ISC16150
     4 52HHEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED,18X,     ISC16160
     5 7H   ZR =,F7.2,8H  METERS/18X,                                  ISC16170
     6 42HLOGICAL UNIT NUMBER OF METEOROLOGICAL DATA,29X,6HIMET =,I4)   ISC16180
 9035 FORMAT(18X,52HDECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETIONISC16190
     1 ,18X,7HDECAY =,E12.6/18X,19HSURFACE STATION NO.,                ISC16200
     3 53X,5HISS =,I6/18X,20HYEAR OF SURFACE DATA,52X,5HISY =,I3/18X,  ISC16210
     4 21HUPPER AIR STATION NO.,51X,5HIUS =,I6/18X,                    ISC16220
     5 22HYEAR OF UPPER AIR DATA,50X,5HIUY =,I3)                       ISC16230
 9036 FORMAT(18X,39HLOGICAL UNIT OF CALCULATION 'SAVE' TAPE,30X,       ISC16240
     1 8H ITAP  =,I4)                                                  ISC16250
 9037 FORMAT(44X,43H*** METEOROLOGICAL DAYS TO BE PROCESSED ***/       ISC16260
     1 63X,6H(IF=1)//8(11X,5(10I2,2X)/))                               ISC16270
 9038 FORMAT(//42X,48H*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***/ ISC16280
     1 62X,8H(METERS)/)                                                ISC16290
 9039 FORMAT(//47X,35H*** RANGES OF POLAR GRID SYSTEM ***/62X,         ISC16300
     1 8H(METERS)/)                                                    ISC16310
 9040 FORMAT(100(5X,10(F10.1,1H,)/))                                   ISC16320
 9041 FORMAT(//42X,48H*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***  ISC16330
     1 /62X,8H(METERS)/)                                               ISC16340
 9042 FORMAT(//45X,42H*** RADIAL ANGLES OF POLAR GRID SYSTEM ***/      ISC16350
     1 /62X,9H(DEGREES)/)                                              ISC16360
 9043 FORMAT(//47X,45H*** X,Y COORDINATES OF DISCRETE RECEPTORS ***/   ISC16370
     1 62X,8H(METERS)/)                                                ISC16380
 9044 FORMAT(//39X,53H*** RANGE,THETA COORDINATES OF DISCRETE RECEPTORS ISC16390
     1***/58X,16H(METERS,DEGREES)/)                                    ISC16400
 9045 FORMAT(100(6X,5(1H(,F9.1,1H,,F9.1,4H),  )/))                     ISC16410
 9046 FORMAT(55X,19H*** SOURCE DATA ***//21X,13HEMISSION RATE,38X,     ISC16420
     1 5HTEMP.,4X,9HEXIT VEL./24X,8HTYPE=0,1,40X,2(6HTYPE=0,4X)/10X,   ISC16430
     2 3HT W,8X,3A4,38X,18H(DEG.K);  (M/SEC);,12X,3(5HBLDG.,4X)/10X,   ISC16440
     3 20HY A NUMBER    TYPE=2,25X,4HBASE,12X,53HVERT.DIM  HORZ.DIM DIAMISC16450
     4ETER  HEIGHT   LENGTH    WIDTH/3X,19HSOURCE P K  PART.  ,3A4,5X,  ISC16460
     5 1HX,8X,43HY      ELEV.   HEIGHT   TYPE=1   TYPE=1,2  ,4(6HTYPE=0,ISC16470
     6 3X)/3X,21HNUMBER E E  CATS. *PER METER**2,2(5(1X,2A4),1X)/       ISC16480
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     7 63(2H -)/)                                                        ISC16490
 9047 FORMAT(I8,I3,I2,I5,3X,E11.5,2F10.1,F8.1,2F9.2,1X,5F9.2)            ISC16500
 9048 FORMAT(I8,I3,I2,I5,3X,2A4,A3,1X,2F9.1,3F9.2,1X,5F9.2)              ISC16510
 9049 FORMAT(50X,31H*** SOURCE PARTICULATE DATA ***//)                   ISC16520
 9050 FORMAT(/10X,19H*** SOURCE NUMBER =,I6,4H ***)                      ISC16530
 9051 FORMAT(/10X,15HMASS FRACTION =/2(10X,10(F7.5,1H,)/))               ISC16540
 9052 FORMAT(/10X,31HSETTLING VELOCITY(METERS/SEC) =/2(10X,10(F7.4,1H,) ISC16550
     1 /))                                                               ISC16560
 9053 FORMAT(/10X,32HSURFACE REFLECTION COEFFICIENT =/2(10X,10(F7.5,1H, ISC16570
     1 )/))                                                              ISC16580
 9054 FORMAT(34X,27H* SEASONAL SOURCE STRENGTHS,3A4,                     ISC16590
     1 26HFOR EACH HOUR OF THE DAY *//20H *** SOURCE NUMBER =,I5,4H ***)ISC16600
 9055 FORMAT(/4X,A4,A2/2(/4X,4HHOUR,I8,11I10/2X,8HSTRENGTH,12E10.4))     ISC16610
 9056 FORMAT(18X,22HALLOCATED DATA STORAGE,48X,7HLIMIT =,I6,6H WORDS/    ISC16620
     1 18X,42HREQUIRED DATA STORAGE FOR THIS PROBLEM RUN,28X,            ISC16630
     2  7HMIMIT =,I6,6H WORDS)                                           ISC16640
 9057 FORMAT(1H0,33X,65H*** NUMBER OF SOURCE NUMBERS REQUIRED TO DEFINE ISC16650
     1SOURCE GROUPS ***/62X,8H(NSOGRP)//3(15X,20(I4,1H,)/))              ISC16660
 9058 FORMAT(1H0,43X,45H*** SOURCE NUMBERS DEFINING SOURCE GROUPS ***/   ISC16670
     1 62X,7H(IOSOR)//8(15X,14(I6,1H,)/))                                ISC16680
 9059 FORMAT(//51X,30H*** WIND PROFILE EXPONENTS ***//)                  ISC16690
 9060 FORMAT(//42X,48H*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***/  ISC16700
     1 53X,26H(DEGREES KELVIN PER METER)//)                              ISC16710
 9062 FORMAT(' SOURCE ',I3,/,6(' IFV   BH   BW   IWAKE'),/,6(6(I4,F6.1,  ISC16720
     1',',F6.1,',',I4),/),/)                                             ISC16730
 9063 FORMAT(7X,'***WARNING***  BUILDING DIMENSIONS ON CARD 6,1 FOR SOURISC16740
     1CE NO. ',I5,' DO NOT MEET THE SCHULMAN-SCIRE CRITERIA. ',/,7X,' THISC16750
     2EREFORE, DIRECTION SPECIFIC BUILDING DIMENSIONS WILL NOT BE INPUT ISC16760
     3INTO THE MODEL. ')                                                 ISC16770
 9064 FORMAT(42X,46H*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***//)    ISC16780
 9065 FORMAT(1H1,3X,'***ERROR*** DIRECTION SPECIFIC HEIGHT OR WIDTH IS GISC16790
     1REATER THAN 9999. FOR SOURCE NO: ',I5,'.  RUN TERMINATED.')        ISC16800
 9066 FORMAT(5(/))                                                       ISC16810
 9520 FORMAT(1X,8E14.5)                                                  ISC16820
 9521 FORMAT(1X,2E14.5,3A4,7A4,2I2)                                      ISC16830
 9522 FORMAT(1X,1X,80I1)                                                 ISC16840
 9523 FORMAT(1X,20I4)                                                    ISC16850
 9524 FORMAT(1X,13I6)                                                    ISC16860
 9525 FORMAT(12F6.0)                                                     ISC16870
 9526 FORMAT(1I5,4I2,11(1PE10.3E1))                                      ISC16880
      END                                                                ISC16890
C                                                                       ISC16900
      SUBROUTINE MODEL(CALC,CHIAV,CHIAN,GRIDX,GRIDY,XDIS,YDIS,GRIDZ,RHT,ISC16910
     1 CHIMAX,CHI50,IPNT,ICOUNT,SOURCE)                                 ISC16920
C               SUBROUTINE MODEL (VERSION 87338), PART OF ISCST.        ISC16930
C     THIS ROUTINE CONTAINS THE MODEL EQUATIONS FOR CALCULATING GROUND- ISC16940
C     LEVEL AND ABOVE GROUND RECEPTOR CONCENTRATION OR DEPOSITION IN-   ISC16950
C     CLUDING THE PLUME RISE EQUATIONS.  THIS ROUTINE ALSO CONTROLS THE ISC16960
C     CALCULATION AND OUTPUT OF ALL TABLES THE PROGRAM PRODUCES.        ISC16970
C                                                                       ISC16980
      INTEGER TITLE,QFLG,QFLGS                                          ISC16990
      LOGICAL WAKE,POLAR,DONE,SGZDON,IFLAG(8),ISW24,WAKAPI              ISC17000
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,        ISC17010
     1 NSOGRP(150),IOSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NIDAY,LINE, ISC17020
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT          ISC17030
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),        ISC17040
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),          ISC17050
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     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                          ISC17060
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,           ISC17070
     *NCMYR,IFLAGC(8),NCM4(6)                                               ISC17080
      DIMENSION ISTORD(36)                                                  ISC17090
      DIMENSION CALC(1),CHIAV(1),CHIAN(1),GRIDX(1),GRIDY(1),XDIS(1),        ISC17100
     1 YDIS(1),GRIDZ(1),CHIMAX(1),CHI50(150,1),IPNT(50,1),ICOUNT(1),        ISC17110
     2 SOURCE(287,1),RHT(1)                                                 ISC17120
C     SIZE OF SASIGZ,SBSIGZ ARRAYS INCREASED FROM 36 TO 38 TO ALLOW FOR     ISC17130
C     ADDITIONAL SIGMA COEFFICIENTS NECESSARY TO ALLOW FOR                  ISC17140
C     SOURCE-RECEPTOR DISTANCES LESS THAN 100M.                             ISC17150
      DIMENSION COSNUM(360),SINNUM(451),RLH(48),SASIGZ(38),SBSIGZ(38),      ISC17160
     1 SP(6),SQ(6),SC(6),SD(6),KAVG(8),MSTAB(24),IMOS(11),ISEAS(12)         ISC17170
      EQUIVALENCE (COSNUM(1),SINNUM(91)),(ISW20,ISW(40)),(VS,SIGYO,XO),     ISC17180
     1 (TS,SIGZO),(POLAR,DONE),(ISW(23),QFLGS)                              ISC17190
      DATA ISTORD/9*1,3*2,3,6*4,9*5,10*6/                                   ISC17200
C     NOTE IN VERSION 87336 SASIGZ AND SBSIGZ CONTAIN EXTRA TERMS           ISC17210
C     TO ALLOW FOR SOURCE-RECEPTORS DISTANCES LESS THAN 100M.               ISC17220
      DATA SASIGZ / 122.8,                                                  ISC17230
     X              158.08,170.22,179.52,217.41,258.89,346.75,2*453.85,    ISC17240
     1 90.673,68.483,10*9.3,61.141,34.459,32.093,32.093,33.504,36.65,       ISC17250
     X  44.053,24.26,                                                       ISC17260
     2        20.331,21.628,21.628,22.534,24.703,26.97,35.42,47.618,        ISC17270
     3 15 209,14.457,13.953,13.953,14.823,16.187,17.836,22.651,27.074,      ISC17280
     4 34.219 /                                                             ISC17290
      DATA SBSIGZ /.9447,                                                   ISC17300
     X              1.0542,1.0932,1.1262,1.2644,1.4094,1.7283,2*2.1166,    ISC17310
     1 .93198,.98332,1.0971,.91465,.86974,.81066,.64403,.60486,.56589,      ISC17320
     X  .57179,.8366,                                                       ISC17330
     2        .81956,.75660,.63077,.57154,.50527,.46713,.37615,.29592,      ISC17340
     3 .81558,.78407,.68465,.63227,.54503,.46490,.41507,.32681,.27436,      ISC17350
     4 .21716 /                                                             ISC17360
      DATA SC,SD / 24.1667,18.333,12.5,8.333,6.25,4.1667,2.5334,1.8096,     ISC17370
     1 1.0857,.72382,.54287,.36191 /, SP,SQ / .004781486,.006474168,        ISC17380
     2 .009684292,.014649868,.019584802,.029481132,1.1235955,1.1086475,     ISC17390
     3 1.0905125,1.0881393,1.0857763,1.0881393 /                            ISC17400
      DATA KAVG / 1,2,3,4,6,8,12,24 /                                       ISC17410
      DATA IMOS / 32,61,92,122,153,183,214,245,275,306,336 /                ISC17420
      DATA ISEAS / 1,1,2,2,2,3,3,3,4,4,4,1 /                               ISC17430
C                                                                           ISC17440
C***  INITIALIZE.                                                           ISC17450
C                                                                           ISC17460
C     THE FOLLOWING CHANGES WERE DEVELOPED BY S PERKINS 2/82                ISC17470
C     THIS MODIFICATION CHOPS TERRAIN TO STACK TOP ON A                     ISC17480
C     STACK TO STACK BASIS.                                                 ISC17490
C     INITIALIZE OLDZ TO 0.                                                 ISC17500
C     OLDZ RETAINS THE TERRAIN HT IF TERRAIN HT EXCEEDS STACK HT.           ISC17510
      OLDZ=0.                                                               ISC17520
      ISW24 = ISW(24) .EQ. 1                                                ISC17530
C     INITIALIZE COSNUM & SINNUM ARRAYS WITH COSINE & SINE VALUES OF        ISC17540
C     INTEGER WIND DIRECTIONS.                                              ISC17550
      DO 10  I = 1,451                                                      ISC17560
      A1 = I                                                                ISC17570
   10 SINNUM(I) = SIN(A1*.0174533293)                                       ISC17580
C     IF MAX 50 TABLES ARE NOT COMPUTED, ICOUNT & IPNT DO NOT EXIST.        ISC17590
      IF(ISW(18) .LE. 0) GOTO 30                                            ISC17600
C     INITIALIZE POINTER ARRAY & COUNTER FOR MAXIMUM FIFTY TABLES.          ISC17610
      I1 = NAVG                                                             ISC17620
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      IF(NGROUP .GT. 0) I1 = I1*NGROUP                                  ISC17630
      DO 20  I = 1,I1                                                   ISC17640
      ICOUNT(I) = 0                                                     ISC17650
      DO 20  J = 1,50                                                   ISC17660
   20 IPNT(J,I) = J                                                     ISC17670
C     CALCULATE VIRTUAL DISTANCES FOR ALL SOURCES AND STABILITY         ISC17680
C     CATEGORIES.  ALSO CHECK SOURCE-RECEPTOR DISTANCES.                ISC17690
   30 LINE = 100                                                        ISC17700
      DO 310 I = 1,NSOURC                                               ISC17710
      ITYPE = SOURCE(1,I)                                               ISC17720
      IWAK = ITYPE/8192                                                 ISC17730
      ITYPE = ITYPE - (ITYPE/16)*16                                     ISC17740
      IF(ITYPE-1) 40 ,110,140                                           ISC17750
   40 HB = ABS(SOURCE(11,I))                                            ISC17760
      HW = SOURCE(12,I)                                                 ISC17770
      IF(HB .LE. 0.0 .AND. HW .LE. 0.0) GOTO 160                        ISC17780
      H = HB                                                            ISC17790
      IF(HW .LT. HB) H = HW                                             ISC17800
      DO 50  J = 1,36                                                   ISC17810
C     CHECK IF M.P. VS. P.G. COEFFICIENTS                               ISC17820
      IF(ISW(20) .EQ. 3) GOTO 45                                        ISC17830
      SOURCE(81+J,I) = (1.2*H/SASIGZ(J))**(1./SBSIGZ(J)) - .01*H        ISC17840
      GOTO 50                                                           ISC17850
45    K=ISTORD(J)                                                       ISC17860
      XX=1.2*H                                                          ISC17870
      SOURCE(81+J,I)=XVZ(XX,K)-.01*H                                    ISC17880
50    CONTINUE                                                          ISC17890
      IF(HW .GE. HB) GOTO 70                                            ISC17900
      DO 60  J = 1,6                                                    ISC17910
      IF(ISW(20) .EQ. 3) GOTO 55                                        ISC17920
      SOURCE(75+J,I) = (.85*HW*SP(J))**SQ(J) - .01*HW                   ISC17930
      GOTO 60                                                           ISC17940
55    XX=.85*HW                                                         ISC17950
      SOURCE(75+J,I)=XVY(XX,J)-.01*HW                                   ISC17960
60    CONTINUE                                                          ISC17970
      GOTO 160                                                          ISC17980
   70 IF(HW .GT. 5.*HB) GOTO 90                                         ISC17990
      DO 80  J = 1,6                                                    ISC18000
      IF(ISW(20) .EQ. 3) GOTO 75                                        ISC18010
      SOURCE(75+J,I) = ((.35*HW+.5*HB)*SP(J))**SQ(J) - .01*HB           ISC18020
      GOTO 80                                                           ISC18030
75    XX=.35*HW+.5*HB                                                   ISC18040
      SOURCE(75+J,I)=XVY(XX,J)-.01*HB                                   ISC18050
80    CONTINUE                                                          ISC18060
      GOTO 160                                                          ISC18070
   90 H = .85*HB                                                        ISC18080
      IF(IWAK .EQ. 1) H = 2.25*HB                                       ISC18090
      DO 100 J = 1,6                                                    ISC18100
      IF(ISW(20).EQ.3)GOTO 95                                           ISC18110
      SOURCE(75+J,I) = (H*SP(J))**SQ(J) - .01*HB                        ISC18120
      GOTO 100                                                          ISC18130
95    SOURCE(75+J,I)=XVY(H,J)-.01*HB                                    ISC18140
100   CONTINUE                                                          ISC18150
      GOTO 160                                                          ISC18160
  110 SIGYO = SOURCE(9,I)                                               ISC18170
      SIGZO = SOURCE(8,I)                                               ISC18180
      DO 120 J = 1,6                                                    ISC18190
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      IF(SIGYO .LE. 0.) GOTO 120                                        ISC18200
      IF(ISW(20) .NE. 3) SOURCE(75+J,I) = (SIGYO*SP(J))**SQ(J)          ISC18210
      IF(ISW(20) .EQ. 3) SOURCE(75+J,I)=XVY(SIGYO,J)                    ISC18220
120   CONTINUE                                                          ISC18230
      DO 130 J = 1,38                                                   ISC18240
      IF(SIGZO .LE. 0.0) GOTO 130                                       ISC18250
      IF (ISW(20) .EQ. 3) GOTO 125                                      ISC18260
                          SOURCE(81+J,I) = (SIGZO/SASIGZ(J))**          ISC18270
     1                                      (1./SBSIGZ(J))              ISC18280
      GOTO 130                                                          ISC18290
125   K=ISTOPD(J)                                                       ISC18300
      SOURCE(81+J,I)=XVZ(SIGZO,K)                                       ISC18310
130   CONTINUE                                                          ISC18320
      GOTO 160                                                          ISC18330
  140 XO = SOURCE(9,I)                                                  ISC18340
      DO 150 J = 1,38                                                   ISC18350
  150 SOURCE(81+J,I) = .001*XO                                          ISC18360
C     NO VIRTUAL DISTANCES CAN BE LESS THAN ZERO.                       ISC18370
  160 DO 170 J = 1,6                                                    ISC18380
  170 IF(SOURCE(75+J,I) .LT. 0.0) SOURCE(75+J,I) = 0.0                  ISC18390
      DO 180 J = 1,38                                                   ISC18400
  180 IF(SOURCE(81+J,I) .LT. 0.0) SOURCE(81+J,I) = 0.0                  ISC18410
  190 A1=.99                                                            ISC18420
      IF(ITYPE-1) 200  ,210  ,220                                       ISC18430
  200 XOP = 0.0                                                         ISC18440
      H = HB                                                            ISC18450
      IF(HW .LT. HB) H = HW                                             ISC18460
      A1 = 3.*H                                                         ISC18470
      IF(A1 .LT. 00.99) A1 = 00.99                                      ISC18480
      GOTO 230                                                          ISC18490
  210 XOP = 2.15*SIGYO                                                  ISC18500
      GOTO 230                                                          ISC18510
  220 XOP = .5641896*SOURCE(9,I)                                        ISC18520
  230 NSO = SOURCE(2,I)                                                 ISC18530
      XS = SOURCE(4,I)                                                  ISC18540
      YS = SOURCE(5,I)                                                  ISC18550
      IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 270                     ISC18560
      POLAR = .FALSE.                                                   ISC18570
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) POLAR = .TRUE.               ISC18580
      DO 260   J = 1,NYPNTS                                             ISC18590
      YR = GRIDY(J)                                                     ISC18600
      I1 = YR                                                           ISC18610
      DO 260   K = 1,NXPNTS                                             ISC18620
      XR = GRIDX(K)                                                     ISC18630
      IF(.NOT.POLAR) GOTO 240                                           ISC18640
      YR = XR*COSNUM(I1)                                                ISC18650
      XR = XR*SINNUM(I1)                                                ISC18660
  240 A3 = YR - YS                                                      ISC18670
      XR = XR - XS                                                      ISC18680
      A2 = SQRT(XR*XR + A3*A3) - XOP                                    ISC18690
C     GET BUILDING WHICH INFLUENCES THIS GRID RECEPTOR                  ISC18700
C     CHECK IF NOT A POINT SOURCE                                       ISC18710
      IF (ITYPE .NE. 0) GO TO 245                                       ISC18720
      IF (A3 .EQ. 0. .AND. XR .EQ. 0.) GO TO 245                        ISC18730
      IF (SOURCE(11,I) .LT. 0.) THEN                                    ISC18740
C     DETERMINE FLOW VECTOR FOR BLDG. DIMENSIONS                        ISC18750
      ANG = ATAN2(XR,A3) * 57.29578                                     ISC18760
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      IF (ANG .GT. 360.0) ANG=ANG-360.0                                 ISC18770
      IFV = INT(ANG*0.10 + 0.5)                                         ISC18780
      IF (IFV .EQ. 0) IFV=36                                            ISC18790
      BH = ABS(SOURCE(215+IFV,I))                                       ISC18800
      BW = SOURCE(251+IFV,I)                                            ISC18810
      H = BH                                                            ISC18820
      IF (BW .LT. BH) H = BW                                            ISC18830
      A1 = 3.0 * H                                                      ISC18840
      IF (A1 .LT. 0.99) A1=0.99                                         ISC18850
      ENDIF                                                             ISC18860
  245 IF(A2 .GE. A1) GOTO 260                                           ISC18870
      IF(LINE .LT. 57) GOTO 250                                         ISC18880
      WRITE(IO,9011)                                                    ISC18890
      WRITE(IO,9005) TITLE                                              ISC18900
      WRITE(IO,9002) CONDEP                                             ISC18910
      LINE = 16                                                         ISC18920
  250 WRITE(IO,9003) NSO,GRIDX(K),GRIDY(J),A2                           ISC18930
      LINE = LINE + 1                                                   ISC18940
  260 CONTINUE                                                          ISC18950
  270 IF(NXWYPT .EQ. 0) GOTO 310                                        ISC18960
      POLAR = .FALSE.                                                   ISC18970
      IF(ISW(3) .EQ. 2) POLAR = .TRUE.                                  ISC18980
      DO 300   J = 1,NXWYPT                                             ISC18990
      YR = YDIS(J)                                                      ISC19000
      XR = XDIS(J)                                                      ISC19010
      IF(.NOT.POLAR) GOTO 280                                           ISC19020
      I1 = YR                                                           ISC19030
      YR = XR*COSNUM(I1)                                                ISC19040
      XR = XR*SINNUM(I1)                                                ISC19050
  280 YR = YR - YS                                                      ISC19060
      XR = XR - XS                                                      ISC19070
      A2 = SQRT(XR*XR + YR*YR) - XOP                                    ISC19080
C     GET BUILDING WHICH INFLUENCES THIS DISCRETE RECEPTOR              ISC19090
C     CHECK IF NOT A POINT SOURCE                                       ISC19100
      IF (ITYPE .NE. 0) GO TO 285                                       ISC19110
      IF (YR .EQ. 0. .AND. XR .EQ. 0.) GO TO 285                        ISC19120
      IF (SOURCE(11,I) .LT. 0.) THEN                                    ISC19130
C     DETERMINE FLOW VECTOR FOR BLDG. DIMENSIONS                        ISC19140
      ANG = ATAN2(XR,YR) * 57.29578                                     ISC19150
      IF (ANG .GT. 360.0) ANG=ANG-360.0                                 ISC19160
      IFV = INT(ANG*0.10 + 0.5)                                         ISC19170
      IF (IFV .EQ. 0) IFV=36                                            ISC19180
      BH = ABS(SOURCE(215+IFV,I))                                       ISC19190
      BW = SOURCE(251+IFV,I)                                            ISC19200
      H = BH                                                            ISC19210
      IF (BW .LT. BH) H = BW                                            ISC19220
      A1 = 3.0 * H                                                      ISC19230
      IF (A1 .LT. 0.99) A1=0.99                                         ISC19240
      ENDIF                                                             ISC19250
  285 IF(A2 .GE. A1) GOTO 300                                           ISC19260
      IF(LINE .LT. 57) GOTO 290                                         ISC19270
      WRITE(IO,9005) TITLE                                              ISC19280
      WRITE(IO,9002) CONDEP                                             ISC19290
      LINE = 16                                                         ISC19300
  290 WRITE(IO,9003) NSO,XDIS(J),YDIS(J),A2                             ISC19310
      LINE = LINE + 1                                                   ISC19320
  300 CONTINUE                                                          ISC19330
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  310 CONTINUE                                                          ISC19340
C     INITIALIZE NUMBER DAYS, HOURS & HOURS PER DAY. SET MIXING HEIGHT  ISC19350
C     INDEX.                                                            ISC19360
      NTDAY = 0                                                         ISC19370
      IF(ISW(19) .GT. 1) GOTO 320                                       ISC19380
      NHOURS = 24                                                       ISC19390
  320 IHH = 1                                                           ISC19400
      IF(ISW(20) .GT. 0) IHH = 2                                        ISC19410
C                                                                       ISC19420
C***  BEGIN LOOP OVER DAYS OF METEOROLOGICAL DATA.                      ISC19430
C     SET OLD WIND DIRECTION BEFORE CALLING SUBROUTINE                  ISC19440
C     FOR CALMPRO OPTION                                                ISC19450
      OLDAFV=-1                                                         ISC19460
C     SET NO. OF CALMS PER YEAR COUNTER TO ZERO                         ISC19470
      NCMYR=0                                                           ISC19480
C                                                                       ISC19490
      DO 1690 IDY = 1,NDAYS                                             ISC19500
      IF(ISW(19) .EQ. 1) GOTO 380                                       ISC19510
C     INPUT A DAY OF CARD MET DATA.                                     ISC19520
      DO 370 I = 1,NHOURS                                               ISC19530
      READ(IMET,9004) JDAY,AFV(I),AWS(I),HLH(I,IHH),TEMP(I),DTHDZ(I),   ISC19540
     1 ISTAB(I),P(I),DECAY(I)                                           ISC19550
C     NOTE IF REG. DEFAULT OPTION IS CHOSEN AND SO2 IS                  ISC19560
C     MODELLED IN AN URBAN MODE DECAY IS SET = .0000481. S**-1(4 HR)    ISC19570
      IF(ISW(28).EQ.1.AND.ISW(29).EQ.1.AND .ISW(20).GT.0)               ISC19580
     1  DECAY(I)=.0000481                                               ISC19590
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                  ISC19600
      AFVR(I) = AFV(I)                                                  ISC19610
      IF(JDAY .LT. 1) JDAY = 1                                          ISC19 20
      IF(I.EQ.1) JDY=JDAY                                               ISC19630
      IF(ISW(21) .EQ. 3 .AND. ISW(22) .EQ. 3) GOTO 350                  ISC19640
C     COMPUTE WIND SPEED CATEGORY IN ORDER TO LOAD DEFAULT VALUE FOR    ISC19650
C     P OR DTHDZ.                                                       ISC19660
      IST = ISTAB(I)                                                    ISC19670
      DO 330 J = 1,5                                                    ISC19680
      ISP = J                                                           ISC19690
      IF(UCATS(J) .GE. AWS(I)) GOTO 340                                 ISC19700
  330 CONTINUE                                                          ISC19710
      ISP = 6                                                           ISC19720
  340 IF(ISW(21) .NE. 3) P(I) = PDEF(ISP,IST)                           ISC19730
      IF(ISW(22) .NE. 3) DTHDZ(I) = DTHDEF(ISP,IST)                     ISC19740
  350 IF(ISW(6) .NE. 2) GOTO 370                                        ISC19750
      IF(I .GT. 1) GOTO 360                                             ISC19760
      WRITE(IO,9001) JDAY                                               ISC19770
      WRITE(IO,9005) TITLE                                              ISC19780
      WRITE(IO,9007) JDAY                                               ISC19790
      WRITE(IO,9006)                                                    ISC19800
  360 WRITE(IO,9008) I,AFV(I),AWS(I),HLH(I,IHH),TEMP(I),DTHDZ(I),       ISC19810
     1 ISTAB(I),P(I),DECAY(I)                                           ISC19820
  370 CONTINUE                                                          ISC19830
      LINE = 0                                                          ISC19840
      GOTO 480                                                          ISC19850
C     INPUT PRE-PROCESSED MET DATA.                                     ISC19860
  380 IF(IDAY(IDY) .GT. 0) GOTO 410                                     ISC19870
      I' = IDY + 1                                                      ISC19880
      IF(IDAY(II) .GT. 0) GOTO 390                                      ISC19890
      READ(IMET) ISTAB                                                  ISC19900
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      GOTO 1690                                                          ISC19910
  390 READ(IMET) JYR,IMO,DAY,ISTAB                                       ISC19920
      LSTAB = ISTAB(1)                                                   ISC19930
      IF(LSTAB .GT. 6) LSTAB = 6                                         ISC19940
      DO 400 I = 2,24                                                    ISC19950
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                   ISC19960
      KSTT = ISTAB(I) - LSTAB                                            ISC19970
      IF(KSTT .GT. 1) ISTAB(I) = LSTAB + 1                               ISC19980
      IF(KSTT .LT. -1) ISTAB(I) = LSTAB - 1                              ISC19990
  400 LSTAB = ISTAB(I)                                                   ISC20000
      GOTO 1690                                                          ISC20010
  410 READ(IMET) JYR,IMO,DAY,ISTAB,AWS,TEMP,AFV,AFVR,HLH                 ISC20020
C     REARRANGE MIXING HEIGHTS.                                          ISC20030
      DO 420 I = 1,2                                                     ISC20040
      DO 420 J = 1,24                                                    ISC20050
      K = (24*(I-1)) + J                                                 ISC20060
  420 RLH(K) = HLH(J,I)                                                  ISC20070
      DO 430 I = 1,48,2                                                  ISC20080
      J = .5*I + 1                                                       ISC20090
  430 HLH(J,1) = RLH(I)                                                  ISC20100
      DO 440 I = 2,49,2                                                  ISC20110
      J = .5*I                                                           ISC20120
  440 HLH(J,2) = RLH(I)                                                  ISC20130
      IF(IDY .EQ. 1) LSTAB = ISTAB(1)                                    ISC20140
      IF(LSTAB .GT. 6) LSTAB = 6                                         ISC20150
C     DO NOT ALLOW STABILITY TO VARY RAPIDLY & ADJUST FOR URBAN MODES.   ISC20160
      DO 460 I = 1,24                                                    ISC20170
      IF(ISTAB(I) .GT. 6) ISTAB(I) = 6                                   ISC20180
      MSTAB(I) = ISTAB(I)                                                ISC20190
      KSTT = ISTAB(I) - LSTAB                                            ISC20200
      IF(KSTT .GT. 1) ISTAB(I) = LSTAB + 1                               ISC20210
      IF(KSTT .LT. -1) ISTAB(I) = LSTAB - 1                              ISC20220
      IF(ISW(20) .EQ. 0 .OR. ISW(20) .EQ. 3) GOTO 460                    ISC20230
      IF(ISW(20) .EQ. 1) GOTO 450                                        ISC20240
      IF(ISTAB(I) .EQ. 6) ISTAB(I) = ISTAB(I) - 1                        ISC20250
      GOTO 460                                                           ISC20260
  450 IF(ISTAB(I) .GT. 4) ISTAB(I) = 4                                   ISC20270
  460 LSTAB = ISTAB(I)                                                   ISC20280
      IF(ISW(6) .NE. 2) GOTO 480                                         ISC20290
      WRITE(IO,9001) IDY                                                 ISC20300
      WRITE(IO,9005) TITLE                                               ISC20310
      WRITE(IO,9007) IDY                                                 ISC20320
      WRITE(IO,9009)                                                     ISC20330
      DO 470 I = 1,24                                                    ISC20340
  470 WRITE(IO,9010) I,AFV(I),AFVR(I),AWS(I),HLH(I,IHM),TEMP(I),         ISC20350
     1 MSTAB(I),ISTAB(I)                                                 ISC20360
      LINE = 0                                                           ISC20370
  480 CONTINUE                                                           ISC20380
C     DETERMINE CALM HOURS FOR EACH AVERAGING PERIOD IF CALM OPTION USED ISC20390
      IF(ISW(27) .EQ. 1) CALL NMCALM(IDY)                                ISC20400
C     SET JULIAN DAY.                                                    ISC20410
      IF(ISW(19) .EQ. 1) JDY = IDY                                       ISC20420
C     FETCH SEASON & MONTH.                                              ISC20430
      IF(ISW(19) .EQ. 1) GOTO 500                                        ISC20440
      DO 490 I = 1,11                                                    ISC20450
      IMO = I                                                            ISC20460
      IF(IMOS(I) .GT. JDY) GOTO 500                                      ISC20470
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  490 CONTINUE                                                          ISC20480
      IMO = 12                                                          ISC20490
  500 CONTINUE                                                          ISC20500
      ISEA = ISEAS(IMO)                                                 ISC20510
C                                                                       ISC20520
C***  BEGIN LOOP OVER MET DATA FOR EACH HOUR.                           ISC20530
C                                                                       ISC20540
C     INITIALIZE CALM FLAGS FOR EACH AVERAGING TIME                     ISC20550
      DO 505 K=1,6                                                      ISC20560
  505 IFLAGC(K)=0                                                       ISC20570
      DO 1670 IHR = 1,NHOURS                                            ISC20580
      IST = ISTAB(IHR)                                                  ISC20590
C     IF URBAN MODE 2, ADJUST STABILITY FOR CALCULATION OF SIGY & SIGZ. ISC20600
      ISTUM2 = IST                                                      ISC20610
      IF(ISW(20) .EQ. 2) ISTUM2 = IST - 1                               ISC20620
      IF(ISTUM2 .LT. 1) ISTUM2 = 1                                      ISC20630
      UBAR = AWS(IHR)                                                   ISC20640
      FV = AFV(IHR)                                                     ISC20650
      FVR = AFVR(IHR)                                                   ISC20660
C     DETERMINE FLOW VECTOR TO THE NEAREST TEN DEGREES                  ISC20670
      IFV = INT(FVR*0.1 + 0.5)                                          ISC20680
      IF (IFV .EQ. 0) IFV = 36                                          ISC20690
      HM = HLH(IHR,IHM)                                                 ISC20700
C     SET MIXING HEIGHT TO 10000.0 SO THAT ONLY FIRST TERM OF VERTICAL  ISC20710
C     EQUATION IS COMPUTED (RURAL MODE, E & F STABILITIES ONLY).        ISC20720
      IF(ISW(20) .EQ. 0 .AND. IST .GT. 4) HM = 10000.0                  ISC20730
      IF (ISW(20) .EQ. 3 .AND. IST .GT. 4) HM=10000.0                   ISC20740
      TA = TEMP(IHR)                                                    ISC20750
      IF(HM .GT. 0.0) HMI = 1./HM                                       ISC20760
C     COMPUTE WIND SPEED CATEGORY FOR THIS HOUR.                        ISC20770
      DO 510 I = 1,5                                                    ISC20780
      ISP = I                                                           ISC20790
      IF(UCATS(I) .GE. UBAR) GOTO 520                                   ISC20800
  510 CONTINUE                                                          ISC20810
      ISP = 6                                                           ISC20820
  520 IF(ISW(19) .EQ. 2) GOTO 530                                       ISC20830
      PP = PDEF(ISP,IST)                                                ISC20840
      DTH = DTHDEF(ISP,IST)                                             ISC20850
      DECAY(IHR) = DDECAY                                               ISC20860
      GOTO 540                                                          ISC20870
  530 PP = P(IHR)                                                       ISC20880
      DTH = DTHDZ(IHR)                                                  ISC20890
  540 CONTINUE                                                          ISC20900
C     CLEAR CALCULATION ARRAY FOR SOURCE SUMMATIONS.                    ISC20910
      NPNTS2 = NPNTS + NPNTS                                            ISC20920
      DO 550 I = 1,NPNTS2                                               ISC20930
  550 CALC(I) = 0.0                                                     ISC20940
C     SET IFLAG FOR DAILY TABLES IF HOUR/TIME PERIOD = INTEGER MULTIPLE.ISC20950
      DO 560  I = 1,6                                                   ISC20960
      IF(ISW(I+6) .NE. 1) GOTO 560                                      ISC20970
      IFLAG(I) = .FALSE.                                                ISC20980
      IF(MOD(IHR,KAVG(I)) .EQ. 0) IFLAG(I) = .TRUE.                     ISC20990
  560 CONTINUE                                                          ISC21000
      IF(HM .LE. 0.0) GOTO 1490                                         ISC21010
C     SET CONCENTRATION TO ZERO FOR CALM OPTION                         ISC21020
      IF(ISW(27) .EQ. 1 .AND. MC(IHR) .EQ. 1) GO TO 1490                ISC21030
C     COMPUTE X & Y SCALARS OF RANDOM FLOW VECTOR.                      ISC21040
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      FVRCOS = (FVR+180.)*.017453293                                    ISC21050
      FVRSIN = SIN(FVRCOS)                                              ISC21060
      FVRCOS = COS(FVRCOS)                                              ISC21070
C                                                                       ISC21080
C***  BEGIN LOOP OVER SOURCES.                                          ISC21090
C                                                                       ISC21100
      DO 1480 IS = 1,NSOURC                                             ISC21110
C     CLEAR CALCULATION ARRAY FOR EACH SOURCE.                          ISC21120
      DO 570 I = 1,NPNTS                                                ISC21130
  570 CALC(I) = 0.0                                                     ISC21140
      HS = SOURCE(7,IS)                                                 ISC21150
      IF(HS .GT. HM) GOTO 1480                                          ISC21160
      ITYPE = SOURCE(1,IS)                                              ISC21170
      XS = SOURCE(4,IS)                                                 ISC21180
      YS = SOURCE(5,IS)                                                 ISC21190
      ZS = SOURCE(6,IS)                                                 ISC21200
      VS = SOURCE(9,IS)                                                 ISC21210
      HB = ABS(SOURCE(11,IS))                                           ISC21220
      HW = SOURCE(12,IS)                                                ISC21230
      D = SOURCE(10,IS)                                                 ISC21240
      TS = SOURCE(8,IS)                                                 ISC21250
      NSO = SOURCE(2,IS)                                                ISC21260
      IWAK = ITYPE/8192                                                 ISC21270
      QFLG = ITYPE/512 - (ITYPE/8192)*16                                ISC21280
      NVS = ITYPE/16 - (ITYPE/512)*32                                   ISC21290
      ITYPE = ITYPE - (ITYPE/16)*16                                     ISC21300
      XY = SOURCE(ISTUM2+75,IS)                                         ISC21310
      XMAX = 0.0                                                        ISC21320
C     RETRIEVE SOURCE EMISSIONS RATE (IF ANY).                          ISC21330
      QTK = 1.0                                                         ISC21340
      IF(QFLG .LE. 0 .AND. QFLGS .LE. 0) GOTO 640                       ISC21350
      I1 = IS                                                           ISC21360
      IF(QFLGS .LE. 0) GOTO 580                                         ISC21370
      I1 = 1                                                            ISC21380
      QFLG = QFLGS                                                      ISC21390
  580 I2 = ISEA                                                         ISC21400
      GOTO (630,590 ,600 ,610 ,620 ) ,QFLG                              ISC21410
  590 I2 = IMO                                                          ISC21420
      GOTO 630                                                          ISC21430
  600 I2 = IHR                                                          ISC21440
      GOTO 630                                                          ISC21450
  610 I2 = (IST-1)*6 + ISP                                              ISC21460
      GOTO 630                                                          ISC21470
  620 I2 = (ISEA - 1)*24 + IHR                                          ISC21480
  630 QTK = SOURCE(I2+119,I1)                                           ISC21490
  640 QTK = SOURCE(3,IS)*TK*QTK                                         ISC21500
C     CALCULATE EFFECTIVE WIND SPEED.                                   ISC21510
      UBARS = UBAR                                                      ISC21520
      IF(PP) 670,670,650                                                ISC21530
  650 IF(HS) 670,670,660                                                ISC21540
C     NOTE:  ZR IS IN RECIPROCAL FORM.                                  ISC21550
  660 A1 = HS                                                           ISC21560
      IF(HS .LT. 10.0) A1 = AMIN1(10.0,1./ZR)                           ISC21570
      UBARS = UBAR*(A1*ZR)**PP                                          ISC21580
  670 UBARI = 1./UBARS                                                  ISC21590
C     BEGIN PLUME RISE CALCULATIONS FOR STACK-TYPE SOURCES.             ISC21600
      IF(ITYPE-1) 680,680,880                                           ISC21610
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  680 WAKE = .FALSE.                                                    ISC21620
      WAKAPI=.FALSE.                                                    ISC21630
C     NO STACK TIP DOWNWASH IF DIRECTION SPECIFIC BLDG. DOWNWASH IS USEDISC21640
      IF (SOURCE(11,IS) .LT. 0.0 .AND. ISW(25) .EQ. 2) GOTO 690         ISC21650
C     CHECK FOR DOWNWASH STACK HEIGHT ADJUSTMENT                        ISC21660
      IF(ISW(25) .EQ. 2 .AND. VS .LT. 1.5*UBARS) HS = HS + (VS*UBARI    ISC21670
     1 -1.5)*(D+D)                                                      ISC21680
      IF(HS.LT.0.0) HS=0.0                                              ISC21690
  690 IF(DTH .LE. 0.0) GOTO 710                                         ISC21700
      S = 9.8*DTH/TA                                                    ISC21710
      SI = 1./S                                                         ISC21720
      SS = SQRT(S)                                                      ISC21730
      SSI = 1./SS                                                       ISC21740
  710 CONTINUE                                                          ISC21750
C     IF SOURCE TEMP LE AMBIENT TEMP, SET SOURCE TEMP                   ISC21760
C     EQUAL TO THE AMBIENT TEMP                                         ISC21770
      IF(TS.LT.TA) TS=TA                                                ISC21780
      TOT=TA/TS                                                         ISC21790
      VSD=VS*D                                                          ISC21800
      FM=TOT*VSD*VSD*.25                                                ISC21810
      F=2.45153*VSD*D*(1.-TOT)                                          ISC21820
      IF(F.LT.0.) F=0.0                                                 ISC21830
      IF(VS.LE.0.0) THEN                                                ISC21840
      BETAJ=1./3. .                                                     ISC21850
      ELSE                                                              ISC21860
      BETAJ=1./3.+UBARS/VS                                              ISC21870
      ENDIF                                                             ISC21880
      BETAJ=BETAJ*BETAJ                                                 ISC21890
      BETAJI=1./BETAJ                                                   ISC21900
      IF(HB .LE. 0.0) GOTO 800                                          ISC21910
C     PLUME RISE USED TO DETERMINE WAKE EFFECTS IS                      ISC21920
C     FROM UNAMAP 5, ISC MOMENTUM RISE AT 2 HB                          ISC21930
      IF(DTH .GT. 0.0) GOTO 780                                         ISC21940
C     UNSTABLE CONDITIONS                                               ISC21950
C     CALCULATE MAX DOWNWIND DISTANCE                                   ISC21960
      IF(F.EQ.0.) THEN                                                  ISC21970
      DMAX=4.*D*UBARI/VS*(VS+3.*UBARS)**2                               ISC21980
      ELSE                                                              ISC21990
      XSTAR=14*F**.625                                                  ISC22000
      IF(F.GT.55.) XSTAR=34*F**.4                                       ISC22010
      DMAX=3.5*XSTAR                                                    ISC22020
      ENDIF                                                             ISC22030
      XBH2=HB+HB                                                        ISC22040
      IF(XBH2.GT.DMAX) XBH2=DMAX                                        ISC22050
      DHA=3.*FM*XBH2*BETAJI*UBARI*UBARI                                 ISC22060
      DHA=DHA**.33333333                                                ISC22070
      GOTO 790                                                          ISC22080
C     STABLE CONDITIONS                                                 ISC22090
  780 DMAX=3.1415926*UBARS*SSI                                          ISC22100
      IF(F.EQ.0.) DMAX=DMAX*.5                                          ISC22110
      XBH2=HB+HB                                                        ISC22120
      IF(XBH2.GT.DMAX) XBH2=DMAX                                        ISC22130
      DHA=AMAX1(1.E-10,3.*FM*BETAJI*UBARI*SSI*SIN(SS*XBH2*UBARI))       ISC22140
      DHA=DHA**.33333333                                                ISC22150
C     DHA1 IS MAX MOMENTUM RISE                                         ISC22160
  790 DHA1=3.*VSD*UBARI                                                 ISC22170
      IF(DHA.GT.DHA1) DHA=DHA1                                          ISC22180
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      DHAWAK=SOURCE(7,IS)+DHA                                          ISC22190
C     SOURCE(7,IS) IS UNADJUSTED STACK HEIGHT                          ISC22200
C     DETERMINE THE DIRECTION SPECIFIC BUILDING DIMENSIONS TO USE      ISC22210
      IF (SOURCE(11,IS) .LT. 0) THEN                                   ISC22220
      BH = ABS(SOURCE(215+IFV,IS))                                     ISC22230
      BW = SOURCE(251+IFV,IS)                                          ISC22240
      ZLB = AMIN1(BH,BW)                                               ISC22250
      ENDIF                                                            ISC22260
C     DETERMINE THE BUILDING DOWNWASH METHOD TO USE                    ISC22270
      IF(DHAWAK.LT.2.5*HB .AND. DHAWAK.LT.HB+1.5*HW) WAKE = .TRUE.     ISC22280
      IF (SOURCE(11,IS) .LT. 0.) THEN                                  ISC22290
      IF (SOURCE(7,IS).LE.1.5*BH.OR.SOURCE(7,IS).LE.(BH+.5*BW))        ISC22300
     1  WAKAPI = .TRUE.                                                ISC22310
      IF (DHAWAK .LT. 3.0*ZLB .AND. WAKAPI) THEN                       ISC22320
      WAKE = .TRUE.                                                    ISC22330
      ELSE                                                             ISC22340
      WAKAPI = .FALSE.                                                 ISC22350
      ENDIF                                                            ISC22360
      IF (BH .EQ. 0.0 .OR. BW .EQ. 0.0) WAKE = .FALSE.                 ISC22370
      ENDIF                                                            ISC22380
  800 CONTINUE                                                         ISC22390
C     DETERMINE XY BASED ON THE SHAPE OF THE BUILDING                  ISC22400
      IF (WAKAPI) THEN                                                 ISC22410
C     IWAK IS FLAG FOR UPPER OR LOWER BOUNDS OF WAKE EFFECTS           ISC22420
      IWAK = 0                                                         ISC22430
      IF( SOURCE(215+IFV,IS) .LT. 0.0 ) IWAK = 1                       ISC22440
C     COMPUTE HORIZONTAL VIRTUAL DISTANCE HERE                         ISC22450
C     XY = F( KST, BH, BW ) ;  BH, BW = F( WD )                        ISC22460
C     POINT SOURCE -- CHECK FOR TYPE OF BUILDING                       ISC22470
  795 IF(BW .GE. BH) GOTO 815                                          ISC22480
C     TALL BUILDING                                                    ISC22490
      IF(ISW(20) .EQ. 3) GOTO 805                                      ISC22500
      XY  = (.65*BW*SP(ISTUM2))**SQ(ISTUM2) - 0.01*BW                  ISC22510
      GOTO 810                                                         ISC22520
  805 XX=.65*BW                                                        ISC22530
      XY = XVY(XX,ISTUM2) - 0.01*BW                                    ISC22540
  810 CONTINUE                                                         ISC22550
      GOTO 865                                                         ISC22560
C     SQUAT BUILDING                                                   ISC22570
  815 IF(BW .GT. 5.*BH) GOTO 835                                       ISC22580
      IF(ISW(20) .EQ. 3) GOTO 820                                      ISC22590
      XY = ((.35*BW+.5*BH)*SP(ISTUM2))**SQ(ISTUM2) - .01*BH            ISC22600
      GOTO 830                                                         ISC22610
  820 XX=.35*BW+.5*BH                                                  ISC22620
      XY = XVY(XX,ISTUM2)-.01*BH                                       ISC22630
  830 CONTINUE                                                         ISC22640
      GOTO 865                                                         ISC22650
C     VERY SQUAT BUILDING                                              ISC22660
  835 H = .65*BH                                                       ISC22670
      IF(IWAK .EQ. 1) H = 2.25*BH                                      ISC22680
      IF(ISW(20).EQ.3) GOTO 840                                        ISC22690
      XY = (H*SP(ISTUM2))**SQ(ISTUM2) - .01*BH                         ISC22700
      GOTO 845                                                         ISC22710
  840 XY = XVY(H,ISTUM2) - .01*BH                                      ISC22720
  845 CONTINUE                                                         ISC22730
C     VOLUME AND AREA SOURCE SIGMA-Y'S ARE STORED IN THE SOURCE ARRAY  ISC22740
  865 IF( XY .LT. 0.0 ) XY = 0.0                                       ISC22750
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C     CHANGE DOWNWASH TO INCLUDE LINEAR DECAY FACTOR                    ISC22760
      IF(DHAWAK .LE. BH) THEN                                           ISC22770
C     LINEAR DECAY FACTOR (A); PLUME BELOW TOP OF BUILDING              ISC22780
      A = 1.0                                                           ISC22790
C     PLUME BELOW H + 2L                                                ISC22800
      ELSE IF(DHAWAK .LE. BH+2.0*ZLB) THEN                              ISC22810
      A = (BH - DHAWAK) / (2.0 * ZLB) + 1.0                             ISC22820
C     PLUME ABOVE H + 2L                                                ISC22830
      ELSE                                                              ISC22840
      A = 0.0                                                           ISC22850
      ENDIF                                                             ISC22860
C     COMPUTE R0, YL TO BE USED IN BLP PLUME RISE EQUATIONS             ISC22870
      R0 = 0.0                                                          ISC22880
      YL = 0.0                                                          ISC22890
C     DOWNWASH THIS HOUR IF A > 0.                                      ISC22900
      IF (A .GT. 0.0) THEN                                              ISC22910
C        0.98995 = 0.7*SQRT(2)                                          ISC22920
      R0 = 0.98995 * A * ZLB                                            ISC22930
C     CHK THAT NORMAL SIGMA-Z IS NOT GREATER THAN DOWNWASH SIGMA-Z      ISC22940
C     DO EITHER MCELROY-POOLER OR P-G CURVES,RESPECTIVELY               ISC22950
      IF( ISW(20) .EQ. 3 ) THEN                                         ISC22960
      A3 = 0.003 * ZLB                                                  ISC22970
      CALL URBNYZ( A3, ISTUM2, DUMMY, A2 )                              ISC22980
C        1.41421 = SQRT(2)                                              ISC22990
      R0 = AMAX1(R0,(1.41421*A*A2))                                     ISC23000
      ELSE                                                              ISC23010
      A3 = 0.003 * ZLB                                                  ISC23020
C     GET DISTANCE INDEX (IXDIST) AT 3*ZLB                              ISC23030
      CALL SIGMAZ(A3,A2,BBAR,ISTUM2,IXDIST,4,SASIGZ,SBSIGZ,DUMMY)       ISC23040
C     GET SIGMAZ AT 3*ZLB                                               ISC23050
      CALL SIGMAZ(A3,A2,BBAR,ISTUM2,IXDIST,1,SASIGZ,SBSIGZ,DUMMY)       ISC23060
      R0 = AMAX1(R0,(1.41421*A*A2))                                     ISC23070
      ENDIF                                                             ISC23080
      ENDIF                                                             ISC23090
C     ENHANCE SIGMA-Y                                                   ISC23100
      IF( DHAWAK .LE. 1.2*BH ) THEN                                     ISC23110
      SYL = .35*ZLB-A2                                                  ISC23120
      SYL = AMAX1(SYL,0.)                                               ISC23130
      IF( BW .LE. 5.*BH ) THEN                                          ISC23140
C        2.5066 = SQRT(2PI)                                             ISC23150
      YL = 2.5066 * SYL                                                 ISC23160
      ELSE IF (IWAK .EQ. 1) THEN                                        ISC23170
C     EDGE EFFECTS OCCUR (SIGMA-Y = 1.75*SQRT(2PI)*BH)                  ISC23180
      YL = 12.533 * SYL                                                 ISC23190
      ELSE                                                              ISC23200
C     SIGMA-Y = 0.35*SQRT(2PI)*BH                                       ISC23210
      YL = 2.5066 * SYL                                                 ISC23220
      ENDIF                                                             ISC23230
C     CHECK THAT SIGMA-Y FROM CURVES IS NOT GREATER THAN                ISC23240
C     SIGMA-Y FROM BUILDING                                             ISC23250
      IF( ISW(20) .EQ. 3 ) THEN                                         ISC23260
      A3 = 0.003 * ZLB                                                  ISC23270
      CALL URBNYZ(A3,ISTUM2,A2,DUMMY)                                   ISC23280
C        2.5066 = SQRT(2PI)                                             ISC23290
      YL = AMAX1(YL,(2.5066*A2))                                        ISC23300
      ELSE                                                              ISC23310
      A3 = 0.003*ZLB                                                    ISC23320
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      TH = 0.01745329*(SC(ISTUM2)-SD(ISTUM2)*ALOG(A3))                    ISC23330
      A2 = 465.11628*A3*TAN(TH)                                           ISC23340
      YL = AMAX1(YL,(2.5066*A2))                                          ISC23350
      ENDIF                                                               ISC23360
      ENDIF                                                               ISC23370
C     ADD BLP FINAL BUOYANT PLUME RISE IF DOWNWASH (WAKAPI = TRUE)        ISC23380
C     DO BLP OR MPTER RISE,RESPECTIVELY                                   ISC23390
C     FM IS PASSED AS 0.0 FOR BUOYANT RISE ONLY                           ISC23400
      CALL BLP(R0,YL,IST,F,0.0,DMAX,UBARS,S,BETAJI,DHA)                   ISC23410
      ELSE                                                                ISC23420
C     MPR1 IS A SUBROUTINE WHICH CALCULATES                               ISC23430
C     PLUME RISE CONSISTENT WITH MPTER.                                   ISC23440
      CALL MPR1(IST,TS,TA,F,D,VS,UBARS,DHA,DTH,DISTF)                     ISC23450
      ENDIF                                                               ISC23460
C     DHASAV IS FINAL PLUME RISE FOR EACH SOURCE.                         ISC23470
      DHASAV=DHA                                                          ISC23480
  880 CONTINUE                                                            ISC23490
C                                                                         ISC23500
C***  BEGIN LOOP OVER RECEPTOR POINTS.                                    ISC23510
C                                                                         ISC23520
      IF(NXPNTS .NE. 0 .AND. NYPNTS .NE. 0) GOTO 900                      ISC23530
  890 IF(NXWYPT .EQ. 0) GOTO 1400                                         ISC23540
      GOTO 910                                                            ISC23550
  900 J = 0                                                               ISC23560
      POLAR = .FALSE.                                                     ISC23570
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) POLAR = .TRUE.                 ISC23580
      NEXTR = 1                                                           ISC23590
      GOTO 920                                                            ISC23600
  910 I = 0                                                               ISC23610
      NEXTR = 3                                                           ISC23620
      POLAR = .FALSE.                                                     ISC23630
      IF(ISW(3) .EQ. 2) POLAR = .TRUE.                                    ISC23640
C     SET TERRAIN CHOPPING PARAMETERS                                     ISC23650
C     IF OLDZ EQ 0. THEN CODE WAS NOT RE-ENTERED DURING LOOP.             ISC23660
  920 IF(OLDZ.EQ.0.) GO TO 925                                            ISC23670
C     IF CODE WAS RE-ENTERED                                              ISC23680
C     SET GRIDZ(IJ) TO ORIGINAL VALUE STORED IN OLDZ                      ISC23690
C     INITIALIZE OLDZ TO 0.                                               ISC23700
      GRIDZ(IJ)=OLDZ                                                      ISC23710
      OLDZ=0.                                                             ISC23720
  925 CONTINUE                                                            ISC23730
      IF(NEXTR-2) 930,950,970                                             ISC23740
  930 J = J + 1                                                           ISC23750
      IF(J. GT. NYPNTS) GOTO 890                                          ISC23760
      YR = GRIDY(J)                                                       ISC23770
      IF(.NOT.POLAR) GOTO 940                                             ISC23780
      IYR = YR                                                            ISC23790
      YRS = SINNUM(IYR)                                                   ISC23800
      YRC = COSNUM(IYR)                                                   ISC23810
  940 IJ = (J-1)*NXPNTS                                                   ISC23820
      I = 0                                                               ISC23830
      NEXTR = 2                                                           ISC23840
  950 I = I + 1                                                           ISC23850
      IF(I .LE. NXPNTS) GOTO 960                                          ISC23860
      NEXTR = 1                                                           ISC23870
      GOTO 920                                                            ISC23880
  960 IJ = IJ + 1                                                         ISC23890
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      XR = GRIDX(I)                                                     ISC23900
      GOTO 990                                                          ISC23910
  970 I = I + 1                                                         ISC23920
      IF(I .GT. NXNYPT) GOTO 1400                                       ISC23930
      YR = YDIS(I)                                                      ISC23940
      IF(.NOT.POLAR) GOTO 980                                           ISC23950
      IYR = YR                                                          ISC23960
      YRS = SINNUM(IYR)                                                 ISC23970
      YRC = COSNUM(IYR)                                                 ISC23980
  980 IJ = NXPNTS*NYPNTS + I                                            ISC23990
      XR = XDIS(I)                                                      ISC24000
  990 CONTINUE                                                          ISC24010
      IF(POLAR) GOTO 1000                                               ISC24020
      XR1 = XR -XS                                                      ISC24030
      YR1 = YR - YS                                                     ISC24040
      GOTO 1010                                                         ISC24050
 1000 XR1 = XR*YRS - XS                                                 ISC24060
      YR1 = XR*YRC - YS                                                 ISC24070
C     CHECK IF TERRAIN ELEVATION IS LOWER THAN STACK HEIGHT.            ISC24080
 1010 IF(ISW(4).NE.1.OR.HS+ZS-GRIDZ(IJ).GT.0.0.OR.ITYPE.EQ.2) GOTO 1020 ISC24090
C     APPLY TERRAIN CHOPPING                                            ISC24100
C                                                                       ISC24110
C     GRIDZ(IJ) TERRAIN HEIGHT GREATER THAN STACK HT SO RETAIN          ISC24120
C     TERRAIN HT IN OLDZ.                                               ISC24130
C     IF OLDZ DOES NOT EQ 0. THEN TERRAIN HT HAS BEEN RETAINED          ISC24140
C     AND GRIDZ(IJ) IS SET TO THE STACK HEIGHT -.005 METERS.            ISC24150
C     TERRAIN IS NOW LESS THAN STACK HT AND WE GO TO 1020               ISC24160
      OLDZ=GRIDZ(IJ)                                                    ISC24170
      GRIDZ(IJ)=HS+ZS-.005                                              ISC24180
      GO TO 1020                                                        ISC24190
C     CALCULATE DOWNWIND DISTANCE, XBAR.                                ISC24200
 1020 XBAR = -(XR1*FVRSIN + YR1*FVRCOS)                                 ISC24210
C     SET RHTAG FOR USE IN VERTICAL EQUATIONS WHEN ABOVE GROUND RECEP-  ISC24220
C     TORS ARE USED.                                                    ISC24230
      RHTAG = 0.0                                                       ISC24240
      IF (ISW(31) .EQ. 1) RHTAG = RHT(IJ)                               ISC24250
      IF(XBAR .LE. 0.0) GOTO 920                                        ISC24260
      IF(XMAX .LE. 0.0) GOTO 1030                                       ISC24270
      IF(XBAR .GT. XMAX .AND. ISW(4) .EQ. 0) GOTO 920                   ISC24280
C     CALCULATE CROSSWIND DISTANCE.                                     ISC24290
 1030 YBAR = XR1*FVRCOS - YR1*FVRSIN                                    ISC24300
      XOP = 0.0                                                         ISC24310
C     1./SQRT(3.14159265) = .5641896  (CALCULATE EFFECTIVE RADIUS.)     ISC24320
      IF(ITYPE .EQ. 2) XOP = .5641896*XO                                ISC24330
      IF(ITYPE .EQ. 1) XOP = 2.15*SIGYO                                 ISC24340
      A1 = 3.*HB                                                        ISC24350
      IF(HW .LT. HB) A1 = 3.*HW                                         ISC24360
      IF(A1 .LT. 00.99) A1 = 00.99                                      ISC24370
      IF((XBAR-XOP) .LT. 0.0) GOTO 920                                  ISC24380
      A2 = SQRT(XBAR*XBAR + YBAR*YBAR) - XOP                            ISC24390
      IF(A2 .LT. A1) GOTO 920                                           ISC24400
      YP = XBAR*1.19175359                                              ISC24410
      IF(YBAR .GT. YP) GOTO 920                                         ISC24420
C     ADJUST XBAR TO DOWNWIND EDGE OF AREA SOURCE.                      ISC24430
      IF(ITYPE .EQ. 2) XBAR = XBAR - XOP                                ISC24440
C     RESUME PLUME RISE CALCULATIONS.                                   ISC24450
      H = HS                                                            ISC24460
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      IF(ITYPE .GT. 0) GOTO 1095                                        ISC24470
C     PLUME RISE IN VERSION 87338 HAS BEEN                              ISC24480
C     CHANGED TO BE CONSISTENT WITH MPTER MODEL.                        ISC24490
C     EFFECTIVE PLUME HEIGHT.                                           ISC24500
C     CHECK FOR GRADUAL PLUME RISE.                                     ISC24510
      DHA=DHASAV                                                        ISC24520
      XKM=XBAR*.001                                                     ISC24530
      XBR1=XBAR                                                         ISC24540
C     USE TRANSITIONAL RISE WITH BUILDING DOWNWASH                      ISC24550
      IF(XKM.GE.DISTF.AND..NOT.WAKE) GO TO 1085                         ISC24560
      IF(ISW(24).EQ.1.AND.ISW(26).EQ.2.AND..NOT.WAKE) GO TO 1085        ISC24570
C     DHA IS TRANSITIONAL PLUME RISE                                    ISC24580
      DHA=160.*F**0.333333*XKM**0.666667/UBARS                          ISC24590
      IF(DHA.GT.DHASAV) DHA=DHASAV                                      ISC24600
C     IF WAKE EFFECTS, CALCULATE UNAMAP 5, ISC MOMENTUM RISE            ISC24610
      IF(WAKE) THEN                                                     ISC24620
      IF(.NOT. WAKAPI) THEN                                             ISC24630
      IF(DTH.GT.0.) GO TO 1083                                          ISC24640
C     UNSTABLE CONDITIONS                                               ISC24650
C     DMAX IS MAX DOWNWIND DISTANCE                                     ISC24660
      IF(XBR1.GT.DMAX) XBR1=DMAX                                        ISC24670
      DHA1=3.*FM*XBR1*BETAJI*UBARI*UBARI                                ISC24680
      DHA1=DHA1**.33333333                                              ISC24690
      GO TO 1084                                                        ISC24700
C     STABLE CONDITIONS                                                 ISC24710
 1083 IF(XBR1.GT.DMAX) XBR1=DMAX                                        ISC24720
      DHA1=AMAX1(1.E-10,3.*FM*BETAJI*UBARI*SSI*SIN(SS*XBR1*UBARI))      ISC24730
      DHA1=DHA1**.33333333                                              ISC24740
C     DHA2 IS MAX ISC MOMENTUM RISE                                     ISC24750
 1084 DHA2=3.*VSD*UBARI                                                 ISC24760
      IF(DHA1.GT.DHA2) DHA1=DHA2                                        ISC24770
      IF(DHA.LT.DHA1) DHA=DHA1                                          ISC24780
C     USE GREATER OF UNAMAP 5 ISC MOMENTUM RISE AND                     ISC24790
C     TRANSITIONAL RISE                                                 ISC24800
      ELSE                                                              ISC24810
      XSR = XBAR                                                        ISC24820
C     LIMIT THE DISTANCE TO MAX RISE                                    ISC24830
      IF(XSR .GT. DMAX) XSR = DMAX                                      ISC24840
C     COMPUTE TRANSITIONAL RISE (BLP NEUTRAL, BUOYANT RISE)             ISC24850
      CALL BLPRIZ(4,F,0.0,XSR,UBARS,S,BETAJI,DHA)                       ISC24860
C     DISTANCE TO MAX NEUTRAL MOMENTUM RISE                             ISC24870
      XPRN = 4.*0*UBARI/VS*(VS+3.*UBARS)**2                             ISC24880
C     LIMIT DISTANCE OF UNSTABLE/NEUTRAL MOMENTUM RISE                  ISC24890
      IF(DTH .LE. 0.0) THEN                                             ISC24900
      XSR = AMIN1(XBAR,XPRN)                                            ISC24910
      CALL BLPRIZ(IST,0.0,FM,XSR,UBARS,S,BETAJI,DHA1)                   ISC24920
      ELSE                                                              ISC24930
C     DISTANCE TO MAX STABLE MOMENTUM RISE                              ISC24940
C        1.5707963 = PI/2                                               ISC24950
      XPRS = 1.5707963 * UBARS * SSI                                    ISC24960
      XSR = AMIN1( XBAR, XPRS )                                         ISC24970
      CALL BLPRIZ(IST,0.0,FM,XSR,UBARS,S,BETAJI,DHA1)                   ISC24980
C     COMPUTE MAX NEUTRAL MOMENTUM RISE                                 ISC24990
      CALL BLPRIZ(4,0.0,FM,XPRN,UBARS,S,BETAJI,DHA2)                    ISC25000
C     FIND THE MINIMUM OF MOMENTUM RISE                                 ISC25010
      DHA1 = AMIN1(DHA1,DHA2)                                           ISC25020
      ENDIF                                                             ISC25030
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C     CHOOSE MAXIMUM OF TRANSITIONAL OR MOMENTUM PLUME RISE                ISC25040
      DHA = AMAX1(DHA,DHA1)                                                ISC25050
      ENDIF                                                                ISC25060
      ENDIF                                                                ISC25070
      H=HS+DHA                                                             ISC25080
C     USE TRANSITIONAL RISE WITH BUILDING DOWNWASH                         ISC25090
      IF(ISW(24).EQ.1.AND..NOT.WAKE) GO TO 1085                            ISC25100
      GO TO 1090                                                           ISC25110
 1085 H=HS+DHASAV                                                          ISC25120
 1090 CONTINUE                                                             ISC25130
C     ADJUST H DUE TO TERRAIN                                              ISC25140
 1095 HEFF=H                                                               ISC25150
      IF(ISW(4).NE.1.OR.ITYPE.EQ.2) GO TO 1100                             ISC25160
      A1 = ZS - GRIDZ(IJ)                                                  ISC25170
      H = H + A1                                                           ISC25180
 1100 CONTINUE                                                             ISC25190
C     CHECK FOR PLUME HEIGHT GREATER THAN MIXING HEIGHT                    ISC25200
C     AT SOURCE.                                                           ISC25210
      IF(HEFF.LE.HM) GO TO 1110                                            ISC25220
      XMAX = XBAR                                                          ISC25230
C     IF POLAR & NEXTR=2 & NO TERRAIN, SKIP RINGS FOR THIS RADIAL.         ISC25240
      IF(.NOT.POLAR .OR. NEXTR .NE. 2 .OR. ISW(4) .NE. 0) GOTO 920         ISC25250
      NEXTR = 1                                                            ISC25260
      GOTO 920                                                             ISC25270
 1110 XBARK = .001*XBAR                                                    ISC25280
      XBARY = XBARK                                                        ISC25290
      XBARZ = XBARK                                                        ISC25300
C     CALL SIGMAZ TO COMPUTE EFFECTIVE DOWNWIND DISTANCE INDEX, IXDIST.    ISC25310
      I1 = 3                                                               ISC25320
      IF(ITYPE .EQ. 0 .AND. .NOT.WAKE) I1 = 4                              ISC25330
      IF (WAKAPI) THEN                                                     ISC25340
C     SET FLAG TO ONLY GET IXDIST AND NOT TO CHECK X+XZ                    ISC25350
      I1 = 4                                                               ISC25360
C     USE P-G OR MCELROY-POOLER                                            ISC25370
      IF (ISW(20) .NE. 3) THEN                                             ISC25380
      CALL SIGMAZ(XBARK,SIGZ,BBAR,ISTUM2,IXDIST,I1,SASIGZ,SBSIGZ,DUMMY)    ISC25390
      ELSE                                                                 ISC25400
      CALL URBBAR(XBARK,BBAR,ISTUM2,IXDIST,I1,DUMMY)                       ISC25410
      ENDIF                                                                ISC25420
 1111 JXDIST = IXDIST                                                      ISC25430
C     STACK                                                                ISC25440
 1112 XZ = 0.0                                                             ISC25450
      IF( WAKE ) THEN                                                      ISC25460
C     CHOOSE MINIMIM OF BUILDING HEIGHT AND WIDTH                          ISC25470
      ZLB = AMIN1(BH,BW)                                                   ISC25480
C     SET XZ BASED ON P-G OR MCELROY-POOLER CURVES                         ISC25490
      IF( ISW(20) .NE. 3 ) THEN                                            ISC25500
      XZ=(1.2*ZLB*A/SASIGZ(IXDIST))**(1./SBSIGZ(IXDIST))-.01*ZLB           ISC25510
      ELSE                                                                 ISC25520
      XZ = XVZ( 1.2*ZLB*A, + ISTORD(IXDIST) ) - 0.01*ZLB                   ISC25530
      ENDIF                                                                ISC25540
      ENDIF                                                                ISC25550
C     VOLUME AND AREA SOURCE SIGMA-Z'S ARE STORED IN THE SOURCE ARRAY      ISC25560
 1117 IF( XZ .LT. 0.0 ) XZ = 0.0                                           ISC25570
C     CHECK TO SEE THAT IXDIST DOES NOT CHANGE WHEN XZ IS ADDED            ISC25580
C     TO THE SOURCE RECEPTOR DISTANCE                                      ISC25590
      IF( ISW(20) .NE. 3 ) THEN                                            ISC25600
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      CALL SIGMAZ(XBARK+XZ,SIGZ,BBAR,ISTUM2,IXDIST,I1,SASIGZ,          ISC25610
     1 SBSIGZ,DUMMY)                                                   ISC25620
      ELSE                                                             ISC25630
      CALL URBBAR(XBARK+XZ,BBAR,ISTUM2,IXDIST,4,DUMMY)                 ISC25640
      ENDIF                                                            ISC25650
      IF( IXDIST .GT. JXDIST ) GO TO 1111                              ISC25660
      ELSE                                                             ISC25670
      IF (ISW(20) .NE. 3)                                              ISC25680
     *CALL SIGMAZ(XBARK,SIGZ,BBAR,ISTUM2,IXDIST,I1,SASIGZ,SBSIGZ,      ISC25690
     1 SOURCE(82,IS))                                                  ISC25700
      IF (ISW(20) .EQ. 3) CALL URBBAR(XBARK,BBAR,ISTUM2,IXDIST,I1,     ISC25710
     *    SOURCE(82,IS))                                             ISC25720
      ENDIF                                                            ISC25730
C     CALCULATE LATERAL AND VERTICAL SIGMAS                            ISC25740
      SGZDON = .FALSE.                                                 ISC25750
      IF(ITYPE .GT. 0) GOTO 1130                                       ISC25760
 1120 IF(.NOT.WAKE) GOTO 1190                                          ISC25770
      A1 = HB                                                          ISC25780
      IF(HW .LT. HB) A1 = HW                                           ISC25790
      IF(XBAR .GE. 10.*A1) GOTO 1130                                   ISC25800
      SGZDON = .TRUE.                                                  ISC25810
      IF (WAKAPI) THEN                                                 ISC25820
C     LINEAR DECAY FACTOR ADDED                                        ISC25830
      SIGZ = A * (.7*A1 + .067*(XBAR-3.*A1))                           ISC25840
      ELSE                                                             ISC25850
      SIGZ = .7*A1 + .067*(XBAR-3.*A1)                                 ISC25860
      ENDIF                                                            ISC25870
      IF(ISW(20) .NE. 3) GOTO 1125                                     ISC25880
      CALL URBNYZ(XBARK,ISTUM2,DUMSY,A2)                               ISC25890
      SIGZ=AMAX1(SIGZ,A2)                                              ISC25900
      GOTO 1140                                                        ISC25910
 1125 CONTINUE                                                         ISC25920
C                                                                      ISC25930
      CALL SIGMAZ(XBARK,A2,BBAR,ISTUM2,IXDIST,1,SASIGZ,SBSIGZ,DUMMY)   ISC25940
      SIGZ = AMAX1(SIGZ,A2)                                            ISC25950
      GOTO 1140                                                        ISC25960
 1130 XBARZ = XBARK + SOURCE(IXDIST+81,IS)                             ISC25970
 1140 IF(ITYPE .GT. 0) GOTO 1180                                       ISC25980
      IF(DHAWAK .GT. 1.2*HB) GOTO 1190                                 ISC25990
      IF(XBAR .GE. 10.*A1) GOTO 1180                                   ISC26000
      IF(HW .LE. 5.*HB) GOTO 1160                                      ISC26010
      IF(IWAK .EQ. 1) GOTO 1150                                        ISC26020
      SIGY = .35*HB + .067*(XBAR-3.*HB)                                ISC26030
      GOTO 1170                                                        ISC26040
 1150 SIGY = 1.75*HB + .067*(XBAR - 3.*HB)                             ISC26050
      GOTO 1170                                                        ISC26060
 1160 SIGY = .35*HW + .067*(XBAR - 3.*A1)                              ISC26070
 1170 IF(ISW(20) .NE. 3) GOTO 1175                                     ISC26080
      A3=XBARK+XY                                                      ISC26090
      CALL URBNYZ(A3,ISTUM2,A2,DUMSZ)                                  ISC26100
      SIGY=AMAX1(SIGY,A2)                                              ISC26110
      GOTO 1200                                                        ISC26120
 1175 IF (ISTUM2 .GT. 2) GOTO 1200                                     ISC26130
      A3 = XBARK + XY                                                  ISC26140
      TH = .017453293*(SC(ISTUM2)-SD(ISTUM2)*ALOG(A3))                 ISC26150
      A2 = 465.11628*A3*TAN(TH)                                        ISC26160
      SIGY = AMAX1(SIGY,A2)                                            ISC26170
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      GOTO 1200                                                          ISC26180
 1180 XBARY = XBARK + XY                                                 ISC26190
 1190 IF (ISW(20) .NE. 3) GOTO 1195                                      ISC26200
      CALL URBNYZ(XBARY,ISTUM2,SIGY,DUMSZ)                               ISC26210
      GOTO 1200                                                          ISC26220
 1195 TH = .017453293*(SC(ISTUM2)-SD(ISTUM2)*ALOG(XBARY))                ISC26230
      SIGY = 465.11628*XBARY*TAN(TH)                                     ISC26240
 1200 IF(ISW(26).EQ.2.OR.ITYPE.GT.8) GO TO 1205                          ISC26250
C     SKIP B.I.D. CALC. IF DIRECTION SPECIFIC BUILDING DOWNWASH IS USED  ISC26260
      IF (WAKAPI) GOTO 1205                                              ISC26270
      IF(ISW(26).EQ.2.OR.ITYPE.GT.8) GO TO 1205                          ISC26280
C     ADJUST SIGY FOR BUOYANCY INDUCED DISPERSION                        ISC26290
      DUM=DHA/3.5                                                        ISC26300
      DUM=DUM*DUM                                                        ISC26310
      SIGY=SQRT(SIGY*SIGY+DUM)                                           ISC26320
 1205 SIGYI=1./SIGY                                                      ISC26330
      IF(ITYPE .EQ. 2) GOTO 1210                                         ISC26340
      A1 = .5*(YBAR*SIGYI)**2                                            ISC26350
      IF(A1 .GT. 50.0) GOTO 920                                          ISC26360
 1210 IF(SGZDON) GOTO 1220                                               ISC26370
      IF(ISW(20) .NE. 3) GOTO 1215                                       ISC26380
      CALL URBNYZ(XBARZ,ISTUM2,DUMSY,SIGZ)                               ISC26390
      GOTO 1218                                                          ISC26400
 1215 CONTINUE                                                           ISC26410
      CALL SIGMAZ(XBARZ,SIGZ,BBAR,ISTUM2,IXDIST,1,SASIGZ,SBSIGZ,DUMMY)   ISC26420
 1218 CONTINUE                                                           ISC26430
 1220 IF(ISW(26).EQ.2.OR.ITYPE.GT.8) GO TO 1225                          ISC26440
C     SKIP B.I.D. CALC. IF DIRECTION SPECIFIC BUILDING DOWNWASH IS USED  ISC26450
      IF (WAKAPI) GOTO 1225                                              ISC26460
      IF(ISW(26).EQ.2.OR.ITYPE.GT.8) GO TO 1225                          ISC26470
C     ADJUST SIGZ FOR BUOYANCY INDUCED DISPERSION                        ISC26480
      SIGZ=SQRT(SIGZ*SIGZ+DUM)                                           ISC26490
 1225 IF(SIGZ.GT.5000..AND.NVS.EQ.0) SIGZ=5000.                          ISC26500
      SIGZI=1./SIGZ                                                      ISC26510
C     CALCULATE DECAY TERM.                                              ISC26520
      XBARU = XBAR*UBARI                                                 ISC26530
      DECAYT = 1.0                                                       ISC26540
      IF(DECAY(IHR) .GT. 0.0) DECAYT = EXP(-DECAY(IHR)*XBARU)            ISC26550
C     CHECK CONCENTRATION-DEPOSITION SWITCH.                             ISC26560
      IF(ISW(1) .EQ. 2) GOTO 1320                                        ISC26570
C     CONCENTRATION EQUATION.                                            ISC26580
C     CHECK FOR PARTICULATES WITH SETTLING VELOCITIES.                   ISC26590
      IF(NVS .GT. 0) GOTO 1260                                           ISC26600
      IF(SIGZ*HMI .LT. 1.6) GOTO 1240                                    ISC26610
C     CALCULATE 'BOX-MODEL' CONCENTRATION                                ISC26620
      IF(ITYPE .EQ. 2) GOTO 1230                                         ISC26630
      CHI = QTK*UBARI*SIGYI*HMI*EXP(-A1)*DECAYT*.39894228                ISC26640
      GOTO 1390                                                          ISC26650
 1230 A3 = .70710678*SIGYI                                               ISC26660
      A4 = (XOP+YBAR)*A3                                                 ISC26670
      A5 = -(XOP-YBAR)*A3                                                ISC26680
      A3 = ERFX(A4,A5)                                                   ISC26690
      CHI = QTK*XO*HMI*UBARI*A3*.5*DECAYT                                ISC26700
      GOTO 1390                                                          ISC26710
C     CALCULATE VERTICAL TERM FOR ALL SOURCE TYPES W/O PARTICLE          ISC26720
C     SETTLING VELOCITIES.                                               ISC26730
 1240 V = 0.0                                                            ISC26740
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      A2 = 0.0                                                          ISC26750
 1250 VL = V                                                            ISC26760
      A2 = A2 + 2.0                                                     ISC26770
      HMA2 = A2*HM                                                      ISC26780
C     SUBTRACT ABOVE GROUND RECEPTOR HTS. OFF THE EXPANDED VERTICAL TERMISC26790
      IF (ISW(31) .NE. 0 .AND. RHTAG .GT. 0.0001) THEN                  ISC26800
      CALL VRTRHT(HMA2,H,RHTAG,SIGZI,A5,A6)                             ISC26810
      GO TO 1255                                                        ISC26820
      ENDIF                                                             ISC26830
      A3 = (HMA2-H)*SIGZI                                               ISC26840
      A4 = (HMA2+H)*SIGZI                                               ISC26850
      A3 = -.5*A3*A3                                                    ISC26860
      A4 = -.5*A4*A4                                                    ISC26870
      A5 = 0.0                                                          ISC26880
      IF(A3 .GT. -50.) A5 = EXP(A3)                                     ISC26890
      A6 = 0.0                                                          ISC26900
      IF(A4 .GT. -50.) A6 = EXP(A4)                                     ISC26910
C     V = V + A5 + A6                                                   ISC26920
 1255 V = V + A5 + A6                                                   ISC26930
      IF(ABS(V-VL) .GT. 1.E-6) GOTO 1250                                ISC26940
C     SUBTRACT ABOVE GROUND RECEPTOR HTS. AND EXPAND VERTICAL TERM WHEN ISC26950
C     ISW(31) IS GREATER THAN 0 OR RECEPTOR HTS. ARE GREATER THAN 0.    ISC26960
      IF (ISW(31) .EQ. 0 .OR. RHTAG .LE. 0.0001) THEN                   ISC26970
      A2 = H*SIGZI                                                      ISC26980
      V = EXP(-.5*A2*A2) + V                                            ISC26990
      ELSE                                                              ISC27000
      B2 = (H+RHTAG)*SIGZI                                              ISC27010
      B1 = (H-RHTAG)*SIGZI                                              ISC27020
      V = EXP(-.5*B1*B1) + EXP(-.5*B2*B2) + V                           ISC27030
      V = .5*V                                                          ISC27040
      ENDIF                                                             ISC27050
      GOTO 1300                                                         ISC27060
C     CALCULATE VERTICAL TERM FOR ALL SOURCE TYPES WITH SETTLING        ISC27070
C     VELOCITIES.                                                       ISC27080
 1260 V = 0.0                                                           ISC27090
      DO 1290 K=1,NVS                                                   ISC27100
      SUM = 0.0                                                         ISC27110
      SUM1 = 0.0                                                        ISC27120
      JP70 = K + 35                                                     ISC27130
      XBARUV = SOURCE(JP70,IS)*XBARU                                    ISC27140
      JP70 = K + 55                                                     ISC27150
      GAMMA = SOURCE(JP70,IS)                                           ISC27160
      JP70 = K + 15                                                     ISC27170
      PHI = SOURCE(JP70,IS)                                             ISC27180
      A2 = 0.0                                                          ISC27190
C     EXPANDED VERTICAL TERM TO SUBTRACT ABOVE GROUND RECEPTOR HT.      ISC27200
      A3 = (-H+XBARUV-RHTAG)*SIGZI                                      ISC27210
      A5 = -.5*A3*A3                                                    ISC27220
      IF(A5 .GT. -50.) SUM = EXP(A5)                                    ISC27230
      IF(GAMMA .LE. 0.0) GOTO 1270                                      ISC27240
C     EXPANDED VERTICAL TERM TO SUBTRACT ABOVE GROUND RECEPTOR HT.      ISC27250
      A4 = (H - XBARUV - RHTAG)*SIGZI                                   ISC27260
      A5 = -.5*A4*A4                                                    ISC27270
      IF(A5 .GT. -50.) SUM = SUM + EXP(A5)*GAMMA                        ISC27280
      CALL VERT(H,HM,XBARUV,SIGZI,GAMMA,A2,SUM,RHTAG)                   ISC27290
 1270 A2 = 2.0                                                          ISC27300
C     EXPANDED VERTICAL TERM TO SUBTRACT ABOVE GROUND RECEPTOR HT.      ISC27310
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      RHTAG1 = -1. * RHTAG                                                  ISC27320
      A3 = (HM+HM-H+XBARUV-RHTAG1)*SIGZI                                    ISC27330
      A5 = -.5*A3*A3                                                        ISC27340
      IF(A5 .GT. -50.) SUM1 = EXP(A5)                                       ISC27350
      IF(GAMMA .LE. 0.0) GOTO 1280                                          ISC27360
C     EXPANDED VERTICAL TERM TO SUBTRACT ABOVE GROUND RECEPTOR HT.          ISC27370
      A4 = (HM+HM+H-XBARUV-RHTAG1)*SIGZI                                    ISC27380
      A5 = -.5*A4*A4                                                        ISC27390
      IF(A5 .GT. -50.) SUM1 = SUM1 + EXP(A5)*GAMMA                          ISC27400
      CALL VERT(H,HM,XBARUV,SIGZI,GAMMA,A2,SUM1,RHTAG1)                     ISC27410
 1280 V = V + .5*PHI*(SUM+SUM1)                                             ISC27420
 1290 CONTINUE                                                              ISC27430
C     CALCULATE CONCENTRATON FOR ALL SOURCE TYPES WITH VERTICAL TERM.       ISC27440
 1300 IF(ITYPE .EQ. 2) GOTO 1310                                            ISC27450
      CHI = QTK*UBARI*SIGYI*SIGZI*EXP(-A1)*V*DECAYT*.31830989               ISC27460
      GOTO 1390                                                             ISC27470
 1310 A3 = .70710678*SIGYI                                                  ISC27480
      A4 = (XOP+YBAR)*A3                                                    ISC27490
      A5 = -(XOP-YBAR)*A3                                                   ISC27500
      A3 = ERFX(A4,A5)                                                      ISC27510
      CHI = QTK*XO*SIGZI*UBARI*V*DECAYT*A3*.39894228                        ISC27520
      GOTO 1390                                                             ISC27530
C     BEGIN DEPOSITION CALCULATIONS.                                        ISC27540
 1320 IF(NVS .GT. 0) GOTO 1330                                              ISC27550
      IF(LINE .EQ. 0) WRITE(IO,9011)                                        ISC27560
      WRITE(IO,9013) NSO                                                    ISC27570
      STOP                                                                  ISC27590
C     CALL SIGMAZ TO COMPUTE AVERAGE EFFECTIVE DOWNWIND DISTANCE, BBAR.     ISC27590
 1330 CONTINUE                                                              ISC27600
      IF(ISW(20) .NE. 3) CALL SIGMAZ(XBARZ,SIGZ,BBAR,ISTUM2,                ISC27610
     *    IXDIST,2,SASIGZ,SBSIGZ,DUMMY)                                     ISC27620
      IF(ISW(20) .EQ. 3) CALL URBBAR(XBARZ,BBAR,ISTUM2,IXDIST,2,DUMMY)      ISC27630
      V = 0.0                                                               ISC27640
      DO 1370 K = 1,NVS                                                     ISC27650
      JP70 = K + 55                                                         ISC27660
      GAMMA = SOURCE(JP70,IS)                                               ISC27670
      JP70 = K + 15                                                         ISC27680
      PHI = SOURCE(JP70,IS)                                                 ISC27690
      JP70 = K + 35                                                         ISC27700
      XBARUV = XBARU*SOURCE(JP70,IS)                                        ISC27710
      A5 = (1.-BBAR)*XBARUV                                                 ISC27720
      GAM1 = 1.0                                                            ISC27730
      GAM2 = GAMMA                                                          ISC27740
      A2 = 0.0                                                              ISC27750
      SUM = 0.0                                                             ISC27760
 1340 SUM1 = SUM                                                            ISC27770
      A2 = A2 + 2.                                                          ISC27780
      HMA2 = A2*HM                                                          ISC27790
      A3 = (HMA2-H+XBARUV)*SIGZI                                            ISC27800
      A6 = 0.0                                                              ISC27810
      A3 = -.5*A3*A3                                                        ISC27820
      IF(A3 .GT. -50.) A6 = EXP(A3)*GAM1*(BBAR*(HMA2-H)-A5)                 ISC27830
      IF(GAMMA .GT. 0.0) GOTO 1350                                          ISC27840
      SUM = A6                                                              ISC27850
      GOTO 1360                                                             ISC27860
 1350 A4 = (HMA2+H-XBARUV)*SIGZI                                            ISC27870
      A7 = 0.0                                                              ISC27880
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      A4 = -.5*A4*A4                                                    ISC27890
      IF(A4 .GT. -50.) A7 = EXP(A4)*GAM2*(BBAR*(HMA2+H)+A5)             ISC27900
      SUM = SUM + A6 + A7                                               ISC27910
      IF(ABS(SUM-SUML) .LT. 1.E-8) GOTO 1360                            ISC27920
      GAM1 = GAM2                                                       ISC27930
      GAM2 = GAM2*GAMMA                                                 ISC27940
      GOTO 1340                                                         ISC27950
 1360 A3 = (H-XBARUV)*SIGZI                                             ISC27960
      A7 = -.5*A3*A3                                                    ISC27970
      A3 = 0.0                                                          ISC27980
      IF(A7 .GT. -50.) A3 = (BBAR*H + A5)*EXP(A7)                       ISC27990
C     MODEL DOES NOT ALLOW FOR NEGATIVE DEPOSITION                      ISC28000
      VDUM=(1.-GAMMA)*PHI*(A3+SUM)                                      ISC28010
      IF(VDUM.LT.0.) VDUM=0.                                            ISC28020
      V=V+VDUM                                                          ISC28030
 1370 CONTINUE                                                          ISC28040
C     FINISH DEPOSITION CALCULATIONS.                                   ISC28050
      IF(ITYPE .EQ. 2) GOTO 1380                                        ISC28060
      CHI = QTK*SIGYI*SIGZI/XBAR*EXP(-A1)*DECAYT*V*.15915494            ISC28070
      GO TO 1390                                                        ISC28080
 1380 CHI = QTK*XO*SIGZI/XBAR*DECAYT*V*ERFX((XOP+YBAR)*SIGYI*.70710678  ISC28.90
     1 ,-(XOP-YBAR)*SIGYI*.70710678)*.39894228                          ISC28100
C     STORE CONCENTRATION OR DEPOSITION INTO CALC ARRAY.  GO GET        ISC28110
C     NEXT RECEPTOR.                                                    ISC28120
 1390 CALC(IJ) = CHI                                                    ISC28130
      IJP = IJ + NPNTS                                                  ISC28140
      CALC(IJP) = CALC(IJP) + CHI                                       ISC28150
      GOTO 920                                                          ISC28160
 1400 CONTINUE                                                          ISC28170
      IF(NGROUP .EQ. 0) GOTO 1480                                       ISC28180
      NSUM = 0                                                          ISC28190
      DO 1470 IG = 1,NGROUP                                             ISC28200
      NS = NSOGRP(IG)                                                   ISC28210
      DO 1460 N = 1,NS                                                  ISC28220
      NNSO = IDSOR(NSUM+1)                                              ISC28230
      IF(NNSO .GT. 0) GOTO 1410                                         ISC28240
      NNSO = -NNSO                                                      ISC28250
      MNSO = IDSOR(NSUM) + 1                                            ISC28260
      IF(NSO .LT. MNSO .OR. NSO .GT. NNSO) GOTO 1460                    ISC28270
      GOTO 1420                                                         ISC28280
 1410 IF(NNSO .NE. NSO) GOTO 1460                                       ISC28290
C     LOAD THIS SOURCE CHI INTO APPROPRIATE CHIAV ARRAYS.               ISC28300
 1420 IAVG = 0                                                          ISC28310
      DO 1440 I = 1,8                                                   ISC28320
      IF(ISW(I+4) .NE. 1) GOTO 1440                                     ISC28330
      I1 = NPNTS*((IG-1)*NAVG + IAVG)                                   ISC28340
      IAVG = IAVG + 1                                                   ISC28350
      DO 1430 J = 1,NPNTS                                               ISC28360
      IP7 = I1 + J                                                      ISC28370
 1430 CHIAV(IP7) = CHIAV(IP7) + CALC(J)                                 ISC28380
 1440 CONTINUE                                                          ISC28390
      IF(ISW(15) .NE. 1) GOTO 1460                                      ISC28400
C     LOAD SOURCE CHI FOR ANNUAL TABLE FOR THIS SOURCE GROUP.           ISC28410
      I2 = (IG-1)*NPNTS                                                 ISC28420
      DO 1450 J = 1,NPNTS                                               ISC28430
      IP7 = I2 + J                                                      ISC28440
 1450 CHIAN(IP7) = CHIAN(IP7) + CALC(J)                                 ISC28450
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 1460 NSUM = NSUM + 1                                                    ISC28460
 1470 CONTINUE                                                           ISC28470
C     GET NEXT SOURCE                                                   ISC28480
 1480 CONTINUE                                                           ISC28490
 1490 IF(NGROUP .GT. 0) GOTO 1520                                        ISC28500
C     LOAD ALL SOURCE CHI'S INTO APPROPRIATE CHIAV ARRAYS.              ISC28510
      IAVG = 0                                                          ISC28520
      DO 1510 I = 1,8                                                   ISC28530
      IF(ISW(I+6) .NE. 1) GOTO 1510                                     ISC28540
      IP6 = IAVG*NPNTS                                                  ISC28550
      IAVG = IAVG + 1                                                   ISC28560
      DO 1500 J = 1,NPNTS                                               ISC28570
      I2 = IP6 + J                                                      ISC28580
      IP7 = NPNTS + J                                                   ISC28590
 1500 CHIAV(I2) = CHIAV(I2) + CALC(IP7)                                 ISC28600
 1510 CONTINUE                                                          ISC28610
C                                                                       ISC28620
C     BEGIN LOOP OVER ALL SOURCE GROUPS.                                ISC28630
C                                                                       ISC28640
 1520 NSUM = 1                                                          ISC28650
      IG = 1                                                            ISC28660
      IF(NGROUP .LE. 0) GOTO 1540                                       ISC28670
 1530 NS = NSOGRP(IG)                                                   ISC28680
      ITO = NSUM + NS - 1                                               ISC28690
C                                                                       ISC28700
C     BEGIN LOOP OVER ALL TIME PERIODS FOR THIS HOUR.                   ISC28710
C                                                                       ISC28720
 1540 IAVG = 0                                                          ISC28730
      DO 1640  I = 1,8                                                  ISC28740
C     FOR DAILY TABLES COMPUTE AVERAGES, WRITE TO TAPE & PRINT.         ISC28750
      IF(ISW(I+6) .NE. 1) GOTO 1640                                     ISC28760
      IAVG = IAVG + 1                                                   ISC28770
      IF(.NOT.IFLAG(I)) GOTO 1640                                       ISC28780
C     SET CALM FLAGS                                                    ISC28790
      IF(ISW(27).EQ.1) THEN                                             ISC28800
      IFLAGC(I)=0                                                       ISC28810
      JCL=IHR-KAVG(I)+1                                                 ISC28820
      DO 1545 JC=JCL,IHR                                                ISC28830
 1545 IF(NC(JC).EQ.1) IFLAGC(I)=1                                       ISC28840
      ENDIF                                                             ISC28850
      I1 = NPNTS*((IG-1)*NAVG + IAVG - 1)                               ISC28860
      IF(KAVG(I) .EQ. 1.OR. ISW(1) .EQ. 2) GOTO 1560                    ISC28870
      A1 = 1./KAVG(I)                                                   ISC28880
C     CALL SUBROUTINE TO DETERMINE A1 IF CALM OPTION IS USED            ISC28890
      IF(ISW(27) .EQ. 1 .AND. I .GT. 3) CALL AVCALM(I,IHR,A1)           ISC28900
      DO 1550 J = 1,NPNTS                                               ISC28910
      IP7 = I1 + J                                                      ISC28920
 1550 CHIAV(IP7) = CHIAV(IP7)*A1                                        ISC28930
 1560 IF(ISW(5) .EQ. 1) WRITE(ITAP) IHR,JDY,IG,(CHIAV(I1+J),J=1,NPNTS)  ISC28940
      IF(IPERD .GT. 0 .AND. IPERD .NE. IHR/KAVG(I)) GOTO 1570           ISC28950
      IF(ISW(16) .NE. 1) GOTO 1570                                      ISC28960
      IP7 = I1 + 1                                                      ISC28970
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIAV(IP7),KAVG(I),JDY,IHR,1,    ISC28980
     1 NSUM,ITO,IG)                                                     ISC28990
C     CALCULATE HIGHEST & SECOND HIGHEST TABLES IF DESIRED.             ISC29000
 1570 IF(ISW(17) .EQ. 0) GOTO 1600                                      ISC29010
      NPNTS2 = NPNTS + NPNTS                                            ISC29020
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      NPNTS3 = NPNTS2 + NPNTS                                          ISC29030
      IP4 = 4*I1                                                       ISC29040
      IF(ISW(17).GT.1) IP4=6*I1                                        ISC29050
C     512 = 2**9  SHIFT HOUR VALUE & STORE WITH DAY.                   ISC29060
      IHRTS = 512*IHR                                                  ISC29070
      DO 1590 J = 1,NPNTS                                              ISC29080
      JP4 = IP4 + J                                                    ISC29090
      JP5 = I1 + J                                                     ISC29100
      JP2 = JP4 + NPNTS2                                               ISC29110
      JP3 = JP4 + NPNTS3                                               ISC29120
      IF(ISW(17).LT.2) GO TO 1575                                      ISC29130
      JP6=JP3+NPNTS                                                    ISC29140
      JP7=JP6+NPNTS                                                    ISC29150
C     FIRST MAXIMUM                                                    ISC29160
 1575 IF(CHIMAX(JP4) .GE. CHIAV(JP5)) GOTO 1580                        ISC29170
      JP1 = JP4 + NPNTS                                                ISC29180
      IF(ISW(17).GT.1) CHIMAX(JP6)=CHIMAX(JP2)                         ISC29190
      CHIMAX(JP2) = CHIMAX(JP4)                                        ISC29200
      CHIMAX(JP4) = CHIAV(JP5)                                         ISC29210
      IF(ISW(17) .GT.1) CHIMAX(JP7)=CHIMAX(JP3)                        ISC29220
      CHIMAX(JP3) = CHIMAX(JP1)                                        ISC29230
      CHIMAX(JP1) = JDY + IHRTS                                        ISC29240
      IF(IFLAGC(I).EQ.1) CHIMAX(JP1)=CHIMAX(JP1)+1000000.              ISC29250
      GOTO 1590                                                        ISC29260
C     SECOND MAXIMUM                                                   ISC29270
 1580 IF(CHIMAX(JP2) .GE. CHIAV(JP5)) GOTO 1585                        ISC29280
      IF(ISW(17).GT.1) CHIMAX(JP6)=CHIMAX(JP2)                         ISC29290
      CHIMAX(JP2) = CHIAV(JP5)                                         ISC29300
      IF(ISW(17).GT.1) CHIMAX(JP7)=CHIMAX(JP3)                         ISC29310
      CHIMAX(JP3) = JDY + IHRTS                                        ISC29320
      IF(IFLAGC(I).EQ.1) CHIMAX(JP3)=CHIMAX(JP3)+1000000.              ISC29330
      GO TO 1590                                                       ISC29340
C     THIRD MAXIMUM                                                    ISC29350
 1585 IF(ISW(17).LT.2) GO TO 1590                                      ISC29360
       IF(CHIMAX(JP6).GE.CHIAV(JP5)) GO TO 1590                        ISC29370
      CHIMAX(JP6)=CHIAV(JP5)                                           ISC29380
      CHIMAX(JP7)=JDY+IHRTS                                            ISC29390
      IF(IFLAGC(I).EQ.1) CHIMAX(JP7)=CHIMAX(JP7)+1000000.              ISC29400
 1590 CONTINUE                                                         ISC29410
C     CALCULATE 50 HIGHEST CONCENTRATIONS(DEPOSITIONS).                ISC29420
 1600 IF(ISW(18) .NE. 1) GOTO 1610                                     ISC29430
      IP7 = (IG-1)*NAVG                                                ISC29440
      IP6 = I1 + 1                                                     ISC29450
      IP7 = IP7 + IAVG                                                 ISC29460
C     FLAG CALM PERIODS                                                ISC29470
      IF(IFLAGC(I).EQ.1) JDY=JDY+1000000                               ISC29480
      CALL MAX50(CHIAV(IP6),CHI50(1,IP7),IPNT(1,IP7),ICOUNT(IP7),      ISC29490
     1  IHR,JDY)                                                       ISC29500
C     SET JDY BACK TO ACTUAL VALUE                                     ISC29510
      IF(IFLAGC(I).EQ.1) JDY=JDY-1000000                               ISC29520
C     CLEAR 'CHIAV' ARRAY FOR THIS SOURCE GROUP & APPPOPRIATE TIME     ISC29530
C     PERIOD.                                                          ISC29540
 1610 DO 1620 J = 1,NPNTS                                              ISC29550
 1620 CHIAV(I1+J) = 0.0                                                ISC29560
 1630 CONTINUE                                                         ISC29570
 1640 CONTINUE                                                         ISC29580
      IG = IG + 1                                                      ISC29590
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      IF(IG .GT. NGROUP) GOTO 1650                                      ISC29600
      NSUM = NSUM + NS                                                  ISC29610
      GOTO 1530                                                         ISC29620
C     STORE ANNUAL AVERAGE.                                             ISC29630
 1650 IF(ISW(15) .NE. 1 .OR. NGROUP .GT. 0) GOTO 1670                   ISC29640
      DO 1660 I = 1,NPNTS                                               ISC29650
      IP6 = I + NPNTS                                                   ISC29660
 1660 CHIAN(I) = CHIAN(I) + CALC(IP6)                                   ISC29670
C     END HOURLY LOOP.                                                  ISC29680
 1670 CONTINUE                                                          ISC29690
      IF(NAVG.LE.0) GO TO 1685                                          ISC29700
C     CLEAR DAILY AVERAGES ARRAY BEFORE GOING TO NEXT DAY.              ISC29710
      NPNTS2 = NAVG*NPNTS                                               ISC29720
      IF(NGROUP .GT. 0) NPNTS2 = NPNTS2*NGROUP                          ISC29730
      DO 1680 I = 1,NPNTS2                                              ISC29740
 1680 CHIAV(I) = 0.0                                                    ISC29750
 1685 NTDAY = NTDAY + 1                                                 ISC29760
 1690 CONTINUE                                                          ISC29770
C     END OF MET DATA.                                                  ISC29780
      NDAYS = NTDAY                                                     ISC29790
      NSUM = 1                                                          ISC29800
      IG = 1                                                            ISC29810
      IF(NGROUP .LE. 0) GOTO 1710                                       ISC29820
 1700 NS = NSOGRP(IG)                                                   ISC29830
      ITO = NSUM + NS - 1                                               ISC29840
C     PRINT 'N'-DAY TABLE                                               ISC29850
 1710 IF(ISW(15) .NE. 1) GOTO 1730                                      ISC29860
      NHTOT = NTDAY*24                                                  ISC29870
      IF(ISW(19) .NE. 1) NHTOT = NDAYS*NHOURS                           ISC29880
C     ADJUST NHTOT IF USING CALM OPTION                                 ISC29890
      IF(ISW(27) .EQ. 1) NHTOT=NHTOT-NCMYR                              ISC29900
      HTOT = 1./FLOAT(NHTOT)                                            ISC29910
      IF(ISW(1) .EQ. 2) HTOT = 1.0                                      ISC29920
      I1 = (IG-1)*NPNTS + 1                                             ISC29930
      I2 = I1 + NPNTS - 1                                               ISC29940
      DO 1720 I = I1,I2                                                 ISC29950
 1720 CHIAN(I) = CHIAN(I)*HTOT                                          ISC29960
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIAN(I1),75,IDY,IHR,1,NSUM,ITO, ISC29970
     1 IG)                                                              ISC29980
      IF(ISW(5) .EQ. 1) WRITE(ITAP) NHOURS,NTDAY,NGROUP,(CHIAN(I),      ISC29990
     1 I=I1,I2)                                                         ISC30000
C                                                                       ISC30010
C     BEGIN LOOP OVER TIME PERIODS.                                     ISC30020
 1730 IAVG = 0                                                          ISC30030
      DO 1750 I = 1,6                                                   ISC30040
      IF(ISW(I+6) .NE. 1) GOTO 1750                                     ISC30050
      IAVG = IAVG + 1                                                   ISC30060
C     PRINT HIGHEST & SECOND HIGHEST CONCENTRATION(DEPOSITION) TABLES.  ISC30070
      IF(ISW(17) .EQ. 0) GOTO 1740                                      ISC30080
      IDUM=4                                                            ISC30090
      IF(ISW(17).GT.1) IDUM=6                                           ISC30100
      IP6 = IDUM*NPNTS*((IG-1)*NAVG + IAVG - 1) + 1                     ISC30110
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,2,   ISC30120
     1 NSUM,ITO,IG)                                                     ISC30130
      IP6 = IP6 + NPNTS + NPNTS                                         ISC30140
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,3,   ISC30150
     1 NSUM,ITO,IG)                                                     ISC30160
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      IF(ISW(17).LT.2) GO TO 1740                                          ISC30170
      IP6=IP6+NPNTS+NPNTS                                                  ISC30180
      CALL DYOUT(GRIDX,GRIDY,XDIS,YDIS,CHIMAX(IP6),KAVG(I),IDY,IHR,4,      ISC30190
     1 NSUM,ITO,IG)                                                        ISC30200
C     PRINT MAXIMUM 50                                                     ISC30210
 1740 IF(ISW(18) .NE. 1) GOTO 1750                                         ISC30220
      IP6 = (IG-1)*NAVG + IAVG                                             ISC30230
      CALL MAXOT(CHI50(1,IP6),GRIDX,GRIDY,XDIS,YDIS,IPNT(1,IP6),           ISC30240
     1 ICOUNT(IP6),KAVG(I),NSUM,ITO,IG)                                    ISC30250
 1750 CONTINUE                                                            ISC30260
      IG = IG + 1                                                          ISC30270
      IF(IG .GT. NGROUP) GOTO 1760                                         ISC30280
      NSUM = NSUM + NS                                                     ISC30290
      GOTO 1700                                                            ISC30300
 1760 IF(ISW(5) .NE. 1) GOTO 1770                                          ISC30310
      ENDFILE ITAP                                                         ISC30320
      ENDFILE ITAP                                                         ISC30330
 1770 RETURN                                                              ISC30340
 9001 FORMAT(1H1,121X,9HMET. DATA/122X,3HDAY,I4)                          ISC30350
 9002 FORMAT(31X,69H* SOURCE-RECEPTOR COMBINATIONS LESS THAN 001 METERS   ISC30360
     1OR THREE BUILDINGS/34X,25HHEIGHTS IN DISTANCE.  HD ,6H*,            ISC30370
     2 16H IS CALCULATED *///46X,25H- - RECEPTOR LOCATION - -/51X,         ISC30380
     3  1HX,8X,10HY (METERS),10X,8HDISTANCE/31X,6HSOURCE,11X,             ISC30390
     4 2SHOR RANGE   OR DIRECTION,9X,7HBETWEEN/31X,6HNUMBER,11X,          ISC30400
     5 21H(METERS)    (DEGREES),11X,8H(METERS)/30X,30(2H- )/)             ISC30410
 9003 FORMAT(31X,I5,8X,2F13.1,7X,F10.2)                                   ISC30420
 9004 FORMAT(I8,5F8.0,I8,2F8.0)                                           ISC30430
 9005 FORMAT(32X,4H*** ,15A4,4H ***//)                                    ISC30440
 9006 FORMAT(//68X,10HPOT. TEMP./29X,4HFLOW,7X,15HWIND     MIXING,13X,    ISC30450
     1 8HGRADIENT,17X,16HWIND       DECAY/28X,16HVECTOR     SPEED,5X,     ISC30460
     264HHEIGHT     TEMP.    (DEG. K    STABILITY   PROFILE   COEFFICIENISC30470
     3T/20X,92HHOUR   (DEGREES)   (MPS)    (METERS)  (DEG. K)  PER METERISC30480
     4)   CATEGORY   EXPONENT   (PER SEC)/19X,47(2H -)/)                   ISC30490
 9007 FORMAT(49X,29H* METEOROLOGICAL DATA FOR DAY,I4,2H *)                 ISC30500
 9008 FORMAT(21X,I2,F11.1,F10.2,F11.1,F9.1,F12.4,I9,F13.4,E15.6)          ISC30510
 9009 FORMAT(//47X,6HRANDOM/38X,2(4HFLOW,6X),16H WIND     MIXING,15X,     ISC30520
     1 19HINPUT       ADJUSTED/37X,2(6HVECTOR,4X),27H SPEED     HEIGHT    ISC30530
     2  TEMP.,2(3X,9HSTABILITY)/29X,6HHOUR   ,2(10H (DEGREES)),3X,        ISC30540
     3 30H(MPS)    (METERS)  (DEG. K)   ,2(8HCATEGORY,4X)/27X,40(2H -)/)ISC30550
 9010 FORMAT(30X,I2,F11.1,F10.1,F10.2,F11.1,F9.1,I9,I12)                  ISC30560
 9011 FORMAT(1H1)                                                         ISC30570
 9013 FORMAT(10X,25H***ERROR*** SOURCE NUMBER,I6,41H HAS NO GRAVITATIONALISC30580
     1L SETTLING CATEGORIES,/10X,52HWITH WHICH TO CALCULATE DEPOSITION.   ISC30590
     2 RUN TERMINATED.)                                                   ISC30600
      END                                                                 ISC30610
C                                                                         ISC30620
      SUBROUTINE DYOUT(GRIDX,GRIDY,XDIS,YDIS,CON,IAVG,IDY,IHR,IFLAG,      ISC30630
     1 IFR,ITO,IG)                                                        ISC30640
C                  SUBROUTINE DYOUT (VERSION 87338), PART OF ISCST.       ISC30650
C     THIS ROUTINE PRINTS THE DAILY CONCENTRATION (DEPOSITION) FOR A      ISC30660
C     GIVEN TIME PERIOD FOR A GIVEN DAY.  THIS ROUTINE ALSO PRINTS   50*ISC30670
C     THE HIGHEST OR SECOND HIGHEST TABLES OF CONCENTRATION (DEPOSITION)ISC30680
C     FOR A GIVEN AVERAGING TIME.  FINALLY, THIS ROUTINE PRINTS THE     ISC30690
C     'N'-DAY TABLE OR PRINTS ELEVATION HEIGHTS FOR ALL RECEPTOR POINTS ISC30700
C     OR RECEPTOR HEIGHTS ABOVE LOCAL TERRAIN FOR ALL RECEPTORS.        ISC30710
C     IF IAVG = 99, PRINT ELEVATION HEIGHTS.                            ISC30720
C     IF IAVG = 75, PRINT 'N'-DAY TABLE.                                ISC30730
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C     IF IFLAG = 1, PRINT DAILY TABLE.                                          ISC30740
C     IF IFLAG = 2, PRINT HIGHEST TABLE.                                        ISC30750
C     IF IFLAG = 3, PRINT SECOND HIGHEST TABLE.                                 ISC30760
C     IF IFLAG = 4, PRINT THIRD HIGHEST TABLE.                                  ISC30770
      INTEGER TITLE                                                             ISC30780
      LOGICAL ONE                                                               ISC30790
      DIMENSION GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),CON(1)                        ISC30800
      DIMENSION IDAY(5),IHOUR(5)                                                ISC30810
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NOGYPT,NGROUP,                ISC30820
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,         ISC30830
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT                  ISC30840
      CHARACTER*1 CFLAG(5)                                                      ISC30850
      CHARACTER*1 CALM                                                          ISC30860
      CHARACTER*1 NCALM                                                         ISC30870
C     DEFINE CALM PRINTING CHARACTERS                                           ISC30880
      DATA CALM/'C'/,NCALM/' '/                                                 ISC30890
C     SET HOUR AVERAGE LABEL.                                                   ISC30900
      HOUR = 4HHOUR                                                             ISC30910
      IF(IAVG .GT. 1) HOUR = 4HPER.                                             ISC30920
   10 IF(NXPNTS .EQ. 0 .OR. NYPNTS .EQ. 0) GOTO 190                             ISC30930
C     INITIALIZE SUBSCRIPTS & SUBSCRIPT INCREMENTS.                             ISC30940
C     MAXIMUM OF 38 LINES OF Y-AXIS DUE TO HEADING.                             ISC30950
C     MAXIMUM OF 9 VALUES ACROSS FOR X-AXIS FOR DAILY & ANNUAL TABLES;          ISC30960
C     5 VALUES ACROSS FOR HIGHEST & SECOND HIGHEST TABLES.                      ISC30970
      IXINC = 9                                                                 ISC30980
      IF(IFLAG .GT. 1) IXINC = 5                                                ISC30990
      IX = 1                                                                    ISC31000
      JX = IXINC                                                                ISC31010
      IY = NYPNTS - 38                                                          ISC31020
      JY = NYPNTS                                                               ISC31030
C     FIND MAXIMUM VALUE FOR RECEPTOR GRID ONLY.                                ISC31040
      IF(IAVG .EQ. 99) GOTO 30                                                  ISC31050
      NN = NXPNTS*NYPNTS                                                        ISC31060
      CONMAX = 0.0                                                              ISC31070
      DO 20  J = 1,NYPNTS                                                       ISC31080
      L = (J-1)*NXPNTS                                                          ISC31090
      DO 20  I = 1,NXPNTS                                                       ISC31100
      K = L + I                                                                 ISC31110
      IF(CON(K) .LT. CONMAX) GOTO 20                                            ISC31120
      CONMAX = CON(K)                                                           ISC31130
      IXP = I                                                                   ISC31140
      IYP = J                                                                   ISC31150
   20 CONTINUE                                                                  ISC31160
      GOTO 40                                                                   ISC31170
   30 IF(IAVG .NE. 99) GOTO 40                                                  ISC31180
      WRITE(IO,9001)                                                            ISC31190
      WRITE(IO,9010) TITLE                                                      ISC31200
C     PRINT EITHER ELEVATION OR RECEPTOR HEIGHT HEADER.                         ISC31210
      IF (IFLAG .EQ. -1) THEN                                                   ISC31220
      WRITE(IO,9035)                                                            ISC31230
      ELSE                                                                      ISC31240
      WRITE(IO,9011)                                                            ISC31250
      ENDIF                                                                     ISC31260
      WRITE(IO,9009)                                                            ISC31270
      GOTO 100                                                                  ISC31280
   40 IF(IAVG .NE. 75) GOTO 50                                                  ISC31290
      WRITE(IO,9002) NTDAY                                                      ISC31300
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      WRITE(IO,9003) IG                                                    ISC31310
      WRITE(IO,9010) TITLE                                                 ISC31320
      WRITE(IO,9012) NTDAY,CONDEP,ICHIUN                                   ISC31330
      GOTO 90                                                              ISC31340
   50 IF(IFLAG.EQ.4) GO TO 85                                              ISC31350
      IF(IFLAG-2) 60 ,70 ,80                                               ISC31360
   60 I1 = IHR/IAVG                                                        ISC31370
      WRITE(IO,9004) IDY,IAVG,I1                                           ISC31380
      WRITE(IO,9003) IG                                                    ISC31390
      WRITE(IO,9010) TITLE                                                 ISC31400
      WRITE(IO,9013)  IAVG,CONDEP,ICHIUN,IHR,IDY                           ISC31410
      GOTO 90                                                              ISC31420
   70 WRITE(IO,9005) IAVG                                                  ISC31430
      WRITE(IO,9003) IG                                                    ISC31440
      WRITE(IO,9010) TITLE                                                 ISC31450
      WRITE(IO,9014)  IAVG,CONDEP,ICHIUN                                   ISC31460
      GOTO 90                                                              ISC31470
   80 WRITE(IO,9006) IAVG                                                  ISC31480
      WRITE(IO,9003) IG                                                    ISC31490
      WRITE(IO,9010) TITLE                                                 ISC31500
      WRITE(IO,9015)  IAVG,CONDEP,ICHIUN                                   ISC31510
      GO TO 90                                                             ISC31520
   85 WRITE (IO,9033) IAVG                                                 ISC31530
      WRITE(IO,9003) IG                                                    ISC31540
      WRITE(IO,9010) TITLE                                                 ISC31550
      WRITE(IO,9034) IAVG,CONDEP,ICHIUN                                    ISC31560
   90 IF(NGROUP .EQ. 0) WRITE(IO,9007)                                     ISC31570
      IF(NGROUP .GT. 0) WRITE(IO,9008) (IDSOR(I),I=IFR,ITO)                ISC31580
      WRITE(IO,9009)                                                       ISC31590
      WRITE(IO,9016) CONMAX,GRIDX(IXP),GRIDY(IYP)                          ISC31600
C     LABEL AXES DEPENDING ON GRID SYSTEM.                                 ISC31610
  100 IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) GOTO 110                        ISC31620
      WRITE(IO,9017)                                                       ISC31630
      GOTO 120                                                             ISC31640
  110 WRITE(IO,9018)                                                       ISC31650
C     CHECK NUMBER ACROSS & DOWN THE PAGE.                                 ISC31660
  120 IF(NXPNTS .LE. JX) JX = NXPNTS                                       ISC31670
      IF(IY .LT. 0) IY = 0                                                 ISC31680
C     PRINT CONCENTRATIONS(DEPOSITIONS) DEPENDING ON TYPE OF TABLE.        ISC31690
      IF(IFLAG .GT. 1) GOTO 140                                            ISC31700
      IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9019) (GRIDX(I),       ISC31710
     1 I=IX,JX)                                                            ISC31720
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9020) (GRIDX(I),       ISC31730
     1 I=IX,JX)                                                            ISC31740
      WRITE(IO,9021)                                                       ISC31750
      LINE = JY                                                            ISC31760
  130 L = (LINE-1)*NXPNTS                                                  ISC31770
      WRITE(IO,9022) GRIDY(LINE), (CON(L+I),I=IX,JX)                       ISC31780
      LINE = LINE - 1                                                      ISC31790
      IF(LINE .LE. IY) GOTO 170                                            ISC31800
      GOTO 130                                                             ISC31810
  140 IF(ISW(2) .EQ. 1 .OR. ISW(2) .EQ. 3) WRITE(IO,9023) (GRIDX(I),       ISC31820
     1 I=IX,JX)                                                            ISC31830
      IF(ISW(2) .EQ. 2 .OR. ISW(2) .EQ. 4) WRITE(IO,9024) (GRIDX(I),       ISC31840
     1 I=IX,JX)                                                            ISC31850
      WRITE(IO,9021)                                                       ISC31860
      I1 = JX-IX+1                                                         ISC31870
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      LINE = JY                                                          ISC31880
  150 L = (LINE-1)*NXPNTS                                                ISC31890
      DO 160 J = 1,I1                                                    ISC31900
      I2 = L + NPNTS + IX + J - 1                                        ISC31910
      ICON = CON(I2)                                                     ISC31920
C     SET CALM FLAG FOR TABLES                                           ISC31930
      CFLAG(J)=NCALM                                                     ISC31940
      IF(ICON.GT.1000000.) THEN                                          ISC31950
      ICON=ICON-1000000.                                                 ISC31960
      CFLAG(J)=CALM                                                      ISC31970
      ENDIF                                                              ISC31980
      IDAY(J) = ICON - (ICON/512)*512                                    ISC31990
C     37000 OCTAL = 15872 DECIMAL AND MASKS IN HOUR.                     ISC32000
  160 IHOUR(J) = ICON/(512*IAVG)                                         ISC32010
      WRITE(IO,9025) GRIDY(LINE),(CON(L+IX+I-1),CFLAG(I),                ISC32020
     1  IDAY(I),IHOUR(I),I=1,I1)                                         ISC32030
      LINE = LINE - 1                                                    ISC32040
      IF(LINE .GT. IY) GOTO 150                                          ISC32050
C     CHECK FOR MULTIPLE PAGE TABLES.                                    ISC32060
  170 IF(IY .LE. 0) GOTO 180                                             ISC32070
      IY = IY - 38                                                       ISC32080
      JY = JY - 38                                                       ISC32090
      GOTO 30                                                            ISC32100
  180 IF(NXPNTS .LE. JX) GOTO 190                                        ISC32110
      IX = IX + IXINC                                                    ISC32120
      JX = JX + IXINC                                                    ISC32130
      IY = NYPNTS - 38                                                   ISC32140
      JY = NYPNTS                                                        ISC32150
      GOTO 30                                                            ISC32160
  190 IF(NXWYPT .EQ. 0) GOTO 330                                         ISC32170
C     PRINT TABLES FOR DISCRETE POINTS.                                  ISC32180
      NN = NXPNTS*NYPNTS                                                 ISC32190
C     SET SUBSCRIPT VALUES & SUBSCRIPT INCREMENTS.                       ISC32200
      IXINC = 114                                                        ISC32210
      IF(IFLAG .GT. 1) IXINC = 76                                        ISC32220
      IX = 1                                                             ISC32230
      JX = IXINC                                                         ISC32240
      ONE = .FALSE.                                                      ISC32250
  200 IF(NXWYPT .GT. JX) GOTO 210                                        ISC32260
      JX = NXWYPT                                                        ISC32270
      IF((JX/2)*2 .NE. JX) ONE = .TRUE.                                  ISC32280
  210 IF(IAVG .NE. 99) GOTO 220                                          ISC32290
      WRITE(IO,9001)                                                     ISC32300
      WRITE(IO,9010) TITLE                                               ISC32310
C     PRINT EITHER ELEVATION OR RECEPTOR HEIGHT HEADER.                  ISC32320
      IF (IFLAG .EQ. -1) THEN                                            ISC32330
      WRITE(IO,9035)                                                     ISC32340
      ELSE                                                               ISC32350
      WRITE(IO,9011)                                                     ISC32360
      ENDIF                                                              ISC32370
      GOTO 280                                                           ISC32380
  220 IF(IAVG .NE. 75) GOTO 230                                          ISC32390
      WRITE(IO,9002) NTDAY                                               ISC32400
      WRITE(IO,9003) IG                                                  ISC32410
      WRITE(IO,9010) TITLE                                               ISC32420
      WRITE(IO,9012) NTDAY,CONDEP,ICHIUN                                 ISC32430
      GOTO 270                                                           ISC32440
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230 IF(IFLAG.EQ.4) GO TO 265                                                    ISC32450
    IF(IFLAG-2) 240,250,260                                                    ISC32460
240 I1 = IHR/IAVG                                                              ISC32470
    WRITE(IO,9004) IDY,IAVG,I1                                                 ISC32480
    WRITE(IO 9003) IG                                                          ISC32490
    WRITE(IO,9010) TITLE                                                       ISC32500
    WRITE(IO,9013) IAVG,CONDEP,ICHIUN,IHR,IDY                                  ISC32510
    GO TO 270                                                                  ISC32520
250 WRITE(IO,9005) IAVG                                                        ISC32530
    WRITE(IO,9003) IG                                                          ISC32540
    WRITE(IO,9010) TITLE                                                       ISC32550
    WRITE(IO,9014) IAVG,CONDEP,ICHIUN                                          ISC32560
    GOTO 270                                                                   ISC32570
260 WRITE(IO,9006) IAVG                                                        ISC32580
    WRITE(IO,9003) IG                                                          ISC32590
    WRITE(IO,9010) TITLE                                                       ISC32600
    WRITE(IO,9015) IAVG,CONDEP,ICHIUN                                          ISC32610
     GO TO 270                                                                 ISC32620
265 WRITE(IO,9033) IAVG                                                        ISC32630
    WRITE(IO,9003) IG                                                          ISC32640
     WRITE(IO,9010) TITLE                                                      ISC32650
    WRITE(IO,9034) IAVG,CONDEP,ICHIUN                                          ISC32660
270 IF(NGROUP .EQ. 0) WRITE(IO,9007)                                           ISC32670
    IF(NGROUP .GT. 0) WRITE(IO,9008) (IUSOR(I),I=IFR,ITO)                      ISC32680
280 WRITE(IO,9026)                                                             ISC32690
    IF(IFLAG .GT. 1) GOTO 290                                                  ISC32700
    IF(ISW(3) .EQ. 1 .OR. ISW(3) .EQ. 3) WRITE(IO,9027) (CONDEP(3),            ISC32710
   1 I=1,3)                                                                    ISC32720
    IF(ISW(3) .EQ. 2 .OR. ISW(3) .EQ. 4) WRITE(IO,9028) (CONDEP(3),            ISC32730
   1 I=1,3)                                                                    ISC32740
    WRITE(IO,9029) (XDIS(I),YDIS(I),CON(I+NN),I=IX,JX)                         ISC32750
    GOTO 320                                                                   ISC32760
290 IF(ISW(3) .EQ. 1 .OR. ISW(3) .EQ. 3) WRITE(IO,9030) (CONDEP(3),            ISC32770
   1 HOUR,I=1,2)                                                               ISC32780
    IF(ISW(3) .EQ. 2 .OR. ISW(3) .EQ. 4) WRITE(IO,9031) (CONDEP(3),            ISC32790
   1 HOUR,I=1,2)                                                               ISC32800
    NN1 = NN + NPNTS                                                           ISC32810
    DO 310 J = IX,JX,2                                                         ISC32820
    ICON = CON(NN1+J)                                                          ISC32830
C   CALM FLAGS FOR DISCRETE RECEPTORS                                          ISC32840
    CFLAG(1)=NCALM                                                             ISC32850
    IF(ICON.GT.1000000.) THEN                                                  ISC32860
    ICON=ICON-1000000.                                                         ISC32870
    CFLAG(1)=CALM                                                              ISC32880
    ENDIF                                                                      ISC32890
    IDAY(1) = ICON - (ICON/512)*512                                            ISC32900
    IHOUR(1) = ICON/(512*IAVG)                                                 ISC32910
    IF(J .EQ. JX .AND. ONE) GOTO 300                                           ISC32920
    ICON = CON(NN1+J+1)                                                        ISC32930
C   CALM FLAGS FOR DISCRETE RECEPTORS                                          ISC32940
    CFLAG(2)=NCALM                                                             ISC32950
    IF(ICON.GT.1000000.) THEN                                                  ISC32960
    ICON=ICON-1000000.                                                         ISC32970
    CFLAG(2)=CALM                                                              ISC32980
    ENDIF                                                                      ISC32990
    IDAY(2) = ICON - (ICON/512)*512                                            ISC33000
    IHOUR(2) = ICON/(512*IAVG)                                                 ISC33010
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                                                                      ISC33020
      I1 = J + 1                                                      ISC33030
      WRITE(IO,9032) XDIS(J),YDIS(J),CON(NN+J),CFLAG(1),IDAY(1),IHOUR(1)ISC33030
      WRITE(IO,9032) XDIS(I1),YDIS(I1),CON(NN+I1),CFLAG(2),IDAY(2),IHOUR(2)ISC33040
     1 ,XDIS(I1),YDIS(I1),CON(NN+I1),CFLAG(2),IDAY(2),IHOUR(2)        ISC33050
      GOTO 310                                                        ISC33060
  300 WRITE(IO,9032) XDIS(J),YDIS(J),CON(NN+J),CFLAG(1),IDAY(1),IHOUR(1)ISC33060
  310 CONTINUE                                                        ISC33070
C     CHECK FOR MULTIPLE PAGE OUTPUT.                                 ISC33080
  320 IF(NXWYPT .LE. JX) GOTO 330                                     ISC33090
      IX = JX + 1                                                     ISC33100
      JX = JX + IXINC                                                 ISC33110
      GOTO 200                                                        ISC33120
  330 LINE = 0                                                        ISC33130
      RETURN                                                          ISC33140
 9001 FORMAT(1H1//)                                                   ISC33150
 9002 FORMAT(1H1,121X,7H'N'-DAY/122X,I3,5H DAYS)                      ISC33160
 9003 FORMAT(122X,7HSGROUP#,I3)                                       ISC33 70
 9004 FORMAT(1H1,121X,7HDAILY: ,I3/122X,I2,6H-HR/PD,I2)               ISC33180
 9005 FORMAT(1H1,121X,4HHIGH/122X,I2,3H-HR)                           ISC33190
 9006 FORMAT(1H1,121X,6H2ND HIGH/122X,I2,3H-HR)                       ISC33200
 9007 FORMAT(56X,20H* FROM ALL SOURCES *)                             ISC33210
 9008 FORMAT(50X,18H* FROM SOURCES:   ,5(I6,1H,),1H*/5(50X,10(I6,1H,)/))ISC33220
 9009 FORMAT(53X,25H* FOR THE RECEPTOR GRID */)                       ISC33230
 9010 FORMAT(32X,4H*** ,15A4,4H ***//)                                ISC33240
 9011 FORMAT(/50X,31H* ELEVATION HEIGHTS IN METERS *)                 ISC33250
 9012 FORMAT(35X,2H* ,I3,5H-DAY ,5A4,A2,7A4,2H */)                    ISC33260
 9013 FORMAT(32X,7H* DAILY,I3,6H-HOUR ,5A4,A2,7A4,2H */49X,           ISC33270
     1 18H* ENDING WITH HOUR,I3, 8H FOR DAY,I4,2H *)                  ISC33280
 9014 FORMAT(31X,9H* HIGHEST,I3,6H-HOUR ,5A4,A2,7A4,2H *)             ISC33290
 9015 FORMAT(27X,16H* SECOND HIGHEST,I3,6H-HOUR ,5A4,A2,7A4,2H *)     ISC33300
 9016 FORMAT(28X,22H* MAXIMUM VALUE EQUALS,F13.5,18H AND OCCURRED AT (, ISC33310
     1 F10.1,1H,,F10.1,3H) */)                                        ISC33320
 9017 FORMAT(13H    Y-AXIS   /,52X,15HX-AXIS (METERS))                ISC33330
 9018 FORMAT(13H  DIRECTION /,52X,14HRANGE (METERS))                  ISC33340
 9019 FORMAT(13H  (METERS)  /,9F13.1)                                 ISC33350
 9020 FORMAT(13H  (DEGREES) /,9F13.1)                                 ISC33360
 9021 FORMAT(64(2H -)/)                                               ISC33370
 9022 FORMAT(F11.1,2H /,9F13.5)                                       ISC33380
 9023 FORMAT(13H  (METERS)  /,6X,5(F13.1,9X))                         ISC33390
 9024 FORMAT(13H  (DEGREES) /,6X,5(F13.1,9X))                         ISC33400
 9025 FORMAT(F11.1,2H /,5(F13.5,A1,1H(,I3,1H,,I2,1H)))                ISC33410
 9026 FORMAT(46X,36H* FOR THE DISCRETE RECEPTOR POINTS */)            ISC33420
 9027 FORMAT(2X,3(16H  - X -      - Y -,9X,A3,1H.,11X)/64(2H -)/)     ISC33430
 9028 FORMAT(2X,3(20H - RNG -     - DIR -,5X,A3,1H.,13X)/64(2H -)/)   ISC33440
 9029 FORMAT(3(2F11.1,F14.5,6X))                                      ISC33450
 9030 FORMAT(13X,2(19H  - X -      - Y - ,7X,A3,7H.     (,4HDAY,,A4,1H),ISC33460
     1 11X)/64(2H -)/)                                                ISC33470
 9031 FORMAT(13X,2(19H- RNG -     - DIR -,5X,A3,7H.     (,4HDAY,,A4, ISC33480
     1 1H),10X)/64(2H -)/)                                            ISC33490
 9032 FORMAT(12X,2(2F11.1,F13.5,A1,2H (,I3,1H,,I2,2H) ,10X))          ISC33500
 9033 FORMAT(1H1,121X,8H3RD HIGH/122X, I2,3H-HR)                      ISC33510
 9034 FORMAT(28X,15H* THIRD HIGHEST,I3,6H-HOUR ,5A4,A2,7A4,2H *)      ISC33520
 9035 FORMAT(/44X,43H* ABOVE GROUND RECEPTOR HEIGHTS IN METERS *)     ISC33530
      END                                                             ISC33540
      SUBROUTINE VRTRHT(HMA2,H,RHTAG,SIGZI,B7,B8)                     ISC33550
C                 SUBROUTINE VRTRHT (VERSION 87336), PART OF ISCST.  ISC33560
C     THIS ROUTINE CALCULATES THE EXPONENTIAL VALUES OF THE VERTICAL  ISC33570
C     TERM WHEN ABOVE GROUND (FLAGPOLE) RECEPTORS ARE USED.           ISC33580
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      B3 = (HMA2 - H - RHTAG)*SIGZI                                          ISC33580
      B4 = (HMA2 + H - RHTAG)*SIGZI                                          ISC33600
      B5 = (HMA2 - H + RHTAG)*SIGZI                                          ISC33610
      B6 = (HMA2 + H + RHTAG)*SIGZI                                          ISC33620
      B3 = -.5*B3*B3                                                         ISC33630
      B4 = -.5*B4*B4                                                         ISC33640
      B5 = -.5*B5*B5                                                         ISC33650
      B6 = -.5*B6*B6                                                         ISC33660
      B7 = 0.0                                                               ISC33670
      B8 = 0.0                                                               ISC33680
      IF (B3 .GT. -25. .OR. B4 .GT. -25.) B7 = EXP(B3) + EXP(B4)             ISC33690
      IF (B5 .GT. -25. .OR. B6 .GT. -25.) B8 = EXP(B5) + EXP(B6)             ISC33700
      RETURN                                                                 ISC33710
      END                                                                    ISC33720
C                                                                            ISC33730
      SUBROUTINE MAXOT(CON,GRIDX,GRIDY,XDIS,YDIS,IPNT,N,IAVG,IFR,ITO,IG)ISC33740
C           SUBROUTINE MAXOT (VERSION 67336), PART OF ISCST.               ISC33750
C     THIS ROUTINE LISTS THE HIGHEST 50 CONCENTRATIONS (DEPOSITIONS)       ISC33760
C     FOR A GIVEN TIME PERIOD.                                             ISC33770
      INTEGER TITLE                                                        ISC33780
      DIMENSION CON(1),GRIDX(1),GRIDY(1),XDIS(1),YDIS(1),IPNT(1),N(1)      ISC33790
      DIMENSION IHR(2),IDY(2),X(2),Y(2),IR(2),CHI(2)                       ISC33800
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXNYPT,NGROUP,           ISC33810
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NIDAY,LINE,    ISC33820
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT             ISC33830
      CHARACTER*1 CFLAG(2)                                                 ISC33840
      CHARACTER*1 CALM                                                     ISC33850
      CHARACTER*1 NCALM                                                    ISC33860
C     SET CALM PRINT CHARACTERS                                            ISC33870
      DATA CALM/'C'/,NCALM/' '/                                            ISC33880
C                                                                          ISC33890
      WRITE(IO,9001) IAVG,IG                                               ISC33900
      WRITE(IO,9004) TITLE                                                 ISC33910
      WRITE(IO,9005) IAVG,CONDEP , ICHIUN                                  ISC33920
      IF(NGROUP .EQ. 0) WRITE(IO,9002)                                     ISC33930
      IF(NGROUP .GT. 0) WRITE(IO,9003) (IDSOR(I),I=IFR,ITO)                ISC33940
      HOUR = 4HPER.                                                        ISC33950
      IF(IAVG .EQ. 1) HOUR = 4HHOUR                                        ISC33960
      WRITE(IO,9006) (CONDEP(3),HOUR,I=1,2)                                ISC33970
      N1 = 1                                                               ISC33980
      N1 = N(N1)                                                           ISC33990
      I2 = (N1+1)/2                                                        ISC34000
      NN = NXPNTS*NYPNTS                                                   ISC34010
      DO 30 I = 1,I2                                                       ISC34020
      DO 20 J = 1,2                                                        ISC34030
      I1 = I + I2*(J-1)                                                    ISC34040
      IF(I1 .GT. N1) GOTO 40                                               ISC34050
      IP = IPNT(I1)                                                        ISC34060
      IR(J) = I1                                                           ISC34070
      CHI(J) = CON(IP)                                                     ISC34080
C     OBTAIN HOUR & DAY.                                                   ISC34090
      IDY(J) = CON(IP+100)                                                 ISC34100
C     SET CALM FLAG FOR TABLE                                              ISC34110
      CFLAG(J)=NCALM                                                       ISC34120
      IF(IDY(J).GT.1000000) THEN                                           ISC34130
      IDY(J)=IDY(J)-1000000                                                ISC34140
      CFLAG(J)=CALM                                                        ISC34150
```

```
      ENDIF                                                             ISC34160
      IHR(J) = IDY(J)/(512*IAVG)                                        ISC34170
      IDY(J) = IDY(J) - (IDY(J)/512)*512                                ISC34180
      K=CON(IP+50)                                                      ISC34190
C     GET X,Y LOCATION OF RECEPTOR.                                     ISC34200
      IF(K .GT. NN) GOTO 10                                             ISC34210
      IY = (K-1)/NXPNTS+1                                               ISC34220
      IX = K - (IY-1)*NXPNTS                                            ISC34230
      X(J) = GRIDX(IX)                                                  ISC34240
      Y(J) = GRIDY(IY)                                                  ISC34250
      GOTO 20                                                           ISC34260
   10 K = K - NN                                                        ISC34270
      X(J) = XDIS(K)                                                    ISC34280
      Y(J) = YDIS(K)                                                    ISC34290
   20 CONTINUE                                                          ISC34300
   30 WRITE(IO,9007) (IR(J),CHI(J),CFLAG(J),IHR(J),                     ISC34310
     X  IDY(J),X(J),Y(J),J=1,2)                                         ISC34320
      RETURN                                                            ISC34330
   40 WRITE(IO,9007)  IR(1),CHI(1),CFLAG(1),IHR(1),IDY(1),X(1),Y(1)     ISC34340
      RETURN                                                            ISC34350
 9001 FORMAT(1H1,121X,6HMAX 50/122X,I2,3H-HR/122X,7HSGROUP0,I3)         ISC34360
 9002 FORMAT(56X,20H* FROM ALL SOURCES *)                               ISC34370
 9003 FORMAT(50X,18H* FROM SOURCES:   ,5(I6,1H,),1H*/5(50X,10(I6,1H,)/))ISC34380
 9004 FORMAT(32X,4H*** ,15A4,4H ***//)                                  ISC34390
 9005 FORMAT(28X,12H* 50 MAXIMUM,I3,6H-HOUR ,5A4,A2,7A4,2H *//)         ISC34400
 9006 FORMAT(//2(44X,1HX,6X,9HY(METERS))/2(44X,2HOR,8X,2HOR,4X)/        ISC34410
     3 2(43X,17HRANGE   DIRECTION)/                                     ISC34420
     1 2(10X,4HRANK,6X,A3,1H.,6X,A4,26H DAY   (METERS)  (DEGREES))/     ISC34430
     2 5X,60(2H- )/)                                                    ISC34440
 9007 FORMAT(2(10X,I3,F15.5,A1,I4,I5,2F11.1))                           ISC34450
      END                                                               ISC34460
C                                                                       ISC34470
      SUBROUTINE MAX50(CON,CON50,IPNT,ICOUNT,IHR,IDY)                   ISC34480
C                SUBROUTINE MAX50 (VERSION 87338), PART OF ISCST.       ISC34490
C     THIS ROUTINE HOLDS THE HIGHEST 50 CONCENTRATIONS (DEPOSITIONS).   ISC34500
C     FOR A GIVEN TIME PERIOD.                                          ISC34510
      INTEGER TITLE                                                     ISC34520
      DIMENSION CON(1),CON50(1),IPNT(1),ICOUNT(1)                       ISC34530
      COMMON /LOGIX/ ISW(40),MSOURC,MXPNTS,NYPNTS,NOMYPT,NGROUP,        ISC34540
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,MHOURS,MDAYS,MTDAY,LINE, ISC34550
     2 IO,IM,TITLE(15),IRUN(3),ICMIUN(7),CONDEP(6),LIMIT,MIMIT          ISC34560
C     SET MAXIMUM NUMBER OF ENTRIES IN TABLE.                           ISC34570
      MAX = 50                                                          ISC34580
      LL = 1                                                            ISC34590
      DO 90  K = 1,NPNTS                                                ISC34600
      IF(ICOUNT(LL) .LT. MAX) GOTO 10                                   ISC34610
C     CHECK IF VALUE IS LESS THAN LOWEST IN MAXIMUM 50 TABLE.           ISC34620
      IP = IPNT(MAX)                                                    ISC34630
      IF(CON(K) .LE. CON50(IP)) GOTO 90                                 ISC34640
      GOTO 20                                                           ISC34650
   10 IF(ICOUNT(LL) .NE. 0) GOTO 20                                     ISC34660
      IICNT = 1                                                         ISC34670
      GOTO 80                                                           ISC34680
   20 I = 1                                                             ISC34690
   30 IP = IPNT(I)                                                      ISC34700
      IF(CON(K) .GE. CON50(IP)) GOTO 40                                 ISC34710
      I = I + 1                                                         ISC34720
```

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      IF(I .LE. ICOUNT(LL)) GOTO 30                                     ISC34730
C     VALUE IS LESS THAN ALL VALUES IN MAXIMUM 50 TABLE.                ISC34740
C     COUNTER, ICOUNT, IS ALWAYS LESS THAN 50 HERE.                     ISC34750
      IICNT = ICOUNT(LL) + 1                                            ISC34760
      GOTO 60                                                           ISC34770
   40 IICNT = ICOUNT(LL) + 1                                            ISC34780
      IF(ICOUNT(LL) .NE. MAX) GOTO 50                                   ISC34790
      IP = IPNT(MAX)                                                    ISC34800
      IICNT = MAX                                                       ISC34810
   50 ISTOP = I + 1                                                     ISC34820
      IF(ISTOP .GT. IICNT) GOTO 70                                      ISC34830
C     SHIFT POINTERS.                                                   ISC34840
      II = IICNT                                                        ISC34850
   60 IPNT(II) = IPNT(II-1)                                             ISC34860
      II = II - 1                                                       ISC34870
      IF(II .GE. ISTOP) GOTO 60                                         ISC34880
   70 IF(ICOUNT(LL) .EQ. MAX) IICNT = IP                                ISC34890
      IPNT(I) = IICNT                                                   ISC34900
C     STORE NEW VALUES INTO MAXIMUM 50 TABLE.                           ISC34910
   80 CON50(IICNT) = CON(K)                                             ISC34920
      CON50(IICNT+MAX) = K                                              ISC34930
C     2**9 = 512 & SHIFTS HOUR 9 BITS.                                  ISC34940
      II = IDY + 512*IHR                                                ISC34950
      CON50(IICNT+MAX+MAX) = II                                         ISC34960
      IF(ICOUNT(LL) .LT. MAX) ICOUNT(LL) = ICOUNT(LL) + 1               ISC34970
   90 CONTINUE                                                          ISC34980
      RETURN                                                            ISC34990
      END                                                               ISC35000
C                                                                       ISC35010
      SUBROUTINE VERT(H,HM,XB,SIGZI,GAM,A2,RESULT,RHT)                  ISC35020
C                 SUBROUTINE VERT (VERSION 87336), PART OF ISCST.       ISC35030
C     THIS ROUTINE COMPILES THE SUMMATION TERM IN THE VERTICAL TERM FOR  ISC35040
C     GRAVITATIONAL SETTLING CATEGORIES.                                ISC35050
C                                                                       ISC35060
      SUM = 0.0                                                         ISC35070
      GAM1 = GAM                                                        ISC35080
      GAM2 = GAM*GAM                                                    ISC35090
   10 A5 = 0.0                                                          ISC35100
      A6 = 0.0                                                          ISC35110
      A2 = A2 + 2.                                                      ISC35120
      SUML = SUM                                                        ISC35130
      HMA2 = HM*A2                                                      ISC35140
      A3 = (HMA2 - H + XB - RHT)*SIGZI                                  ISC35150
      A3 = -.5*A3*A3                                                    ISC35160
      IF(A3 .GT. -50.) A5 = EXP(A3)*GAM1                                ISC35170
      A4 = (HMA2 + H - XB - RHT)*SIGZI                                  ISC35180
      A4 = -.5*A4*A4                                                    ISC35190
      IF(A4 .GT. -50.) A6 = EXP(A4)*GAM2                                ISC35200
      SUM = SUM + A5 + A6                                               ISC35210
      IF(ABS(SUM-SUML) .LT. 1.E-6) GOTO 20                              ISC35220
      GAM1 = GAM2                                                       ISC35230
      GAM2 = GAM2*GAM                                                   ISC35240
      GOTO 10                                                           ISC35250
   20 RESULT = RESULT + SUM                                             ISC35260
      IF(RESULT.LT.0.0) RESULT=0.0                                      ISC35270
      RETURN                                                            ISC35280
      END                                                               ISC35290
```

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                                                                      ISC35300
C                                                                     ISC35310
      SUBROUTINE SIGMAZ(XB,SZ,BB,IST,IXDIST,IFLAG,A,B,XZ)             ISC35320
C                  SUBROUTINE SIGMAZ (VERSION 87338), PART OF ISCST.  ISC35330
C     THIS ROUTINE CALCULATES THE VERTICAL SIGMA GIVEN THE EFFECTIVE  ISC35340
C     DOWNWIND DISTANCE XB IN KILOMETERS AND STABILITY CATEGORY IST.  ISC35350
C     IF IFLAG = 1, CALCULATE SIGMA Z.                                ISC35360
C     IF IFLAG = 2, CALCULATE AVERAGE 'B' ONLY.                       ISC35370
C     IF IFLAG = 3, CALCULATE EFFECTIVE DOWNWIND DISTANCE INDEX IXDIST ISC35380
C                   AS A FUNCTION OF XB, XZ AND STABILITY.            ISC35390
C                                                                     ISC35400
      DIMENSION A(1),B(1),XZ(1),X1(10,6),INDSGZ(6)                    ISC35410
C                                                                     ISC35420
C     ADJUST INDSGZ VALUES TO ALLOW FOR SOURCE-RECEPTOR               ISC35430
C     DISTANCES OF LESS THAN 100M.                                    ISC35440
      DATA INDSGZ /0,9,12,13,19,28/                                   ISC35450
      DATA X1 /.1,.15,.2,.25,.3,.4,.5,3.11,1.E20,0.,  .2,.4,1.E20,7*0., ISC35460
     1 1.E20,9*0.,  .3,1.,3.,10.,30.,1.E20,4*0.,  .1,.3,1.,2.,4.,10.,  ISC35470
     2 20.,40.,1.E20,0.,  .2,.7,1.,2.,3.,7.,15.,30.,60.,1.E20/        ISC35480
C                                                                     ISC35490
      GOTO (80,90,10,10) , IFLAG                                      ISC35500
C                                                                     ISC35510
C     NOTE THAT STABILITY CATEGORY C HAS ONLY 1 DISTANCE CATEGORY.    ISC35520
   10 IF(IST .NE. 3) GOTO 20                                          ISC35530
      IXDIST = 13                                                     ISC35540
      RETURN                                                          ISC35550
   20 X = XB                                                          ISC35560
      I = 1                                                           ISC35570
      II = 0                                                          ISC35580
   30 IF(X-X1(I,IST) .LE. 0.0) GOTO 40                                ISC35590
      I = I + 1                                                       ISC35600
      GOTO 30                                                         ISC35610
   40 IF(I-II) 50,60,70                                               ISC35620
   50 IXDIST = IXDIST - 1                                             ISC35630
   60 RETURN                                                          ISC35640
   70 II = I                                                          ISC35650
      IXDIST = INDSGZ(IST) + I                                        ISC35660
      IF(IFLAG .GT. 3) RETURN                                         ISC35670
      X = XB + XZ(IXDIST)                                             ISC35680
      GOTO 30                                                         ISC35690
C     CALCULATE VERTICAL SIGMA.                                       ISC35700
   80 SZ = A(IXDIST)*XB**B(IXDIST)                                    ISC35710
      RETURN                                                          ISC35720
C     CALCULATE AVERAGE 'B'.                                          ISC35730
   90 BB = 0.0                                                        ISC35740
      I = IXDIST - INDSGZ(IST)                                        ISC35750
      DO 100 J = 1,I                                                  ISC35760
      II = INDSGZ(IST) + J                                            ISC35770
  100 BB = BB + B(II)                                                 ISC35780
      BB = BB/FLOAT(I)                                                ISC35790
      RETURN                                                          ISC35800
      END                                                             ISC35810
C                                                                     ISC35820
      FUNCTION ERFX(A,B)                                              ISC35830
C                  FUNCTION ERFX (VERSION 87338), PART OF ISCST.      ISC35840
C     CALCULATE ERF(A) - ERF(B).                                      ISC35850
C     HPL = LOWER LIMIT    -   HPU = UPPER LIMIT.                     ISC35860
C
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      LOGICAL DONE                                                      ISC35870
      DATA HPL,HPU /1.E-10,10./                                         ISC35880
      ERF(X) = 1+X*(.705230784E-1+X*(.422820123E-1+X*(.92705272E-2+     ISC35890
     1         X*(.1520143E-3+X*(.2765672E-3+X*.430638E-4))))))         ISC35900
C                                                                       ISC35910
      DONE = .FALSE.                                                    ISC35920
      C = A                                                             ISC35930
   10 C = ABS(C)                                                        ISC35940
      IF(C .GT. HPL) GOTO 20                                            ISC35950
      F = 1.                                                            ISC35960
      GOTO 40                                                           ISC35970
   20 IF(C .LT. HPU) GOTO 30                                            ISC35980
      F = 0.0                                                           ISC35990
      GOTO 40                                                           ISC36000
   30 F = ERF(C)                                                        ISC36010
      F = (1./F)**16                                                    ISC36020
   40 IF(DONE) GOTO 50                                                  ISC36030
      C = B                                                             ISC36040
      G = F                                                             ISC36050
      DONE = .TRUE.                                                     ISC36060
      GOTO 10                                                           ISC36070
   50 CONTINUE                                                          ISC36080
      IF(A .GE. 0.0) GOTO 70                                            ISC36090
      IF(B .LT. 0.0) GOTO 60                                            ISC36100
      ERFX = F + G - 2.0                                                ISC36110
      RETURN                                                            ISC36120
   60 ERFX = G - F                                                      ISC36130
      RETURN                                                            ISC36140
   70 IF(B .LT. 0.0) GOTO 80                                            ISC36150
      ERFX = F - G                                                      ISC36160
      RETURN                                                            ISC36170
   80 ERFX = 2.0 - (F + G)                                              ISC36180
      RETURN                                                            ISC36190
      END                                                               ISC36200
C                                                                       ISC36210
      BLOCK DATA                                                        ISC36220
C                     BLOCK DATA (VERSION 87338), PART OF ISCST.        ISC36230
C     SET DEFAULT VALUES.                                               ISC36240
C                                                                       ISC36250
      INTEGER TITLE                                                     ISC36260
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXNYPT,NGROUP,        ISC36270
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE, ISC36280
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT          ISC36290
C                                                                       ISC36300
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),        ISC36310
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),          ISC36320
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                      ISC36330
C                                                                       ISC36340
C     INITIALIZE WIND PROFILE EXPONENTS AND VERTICAL POTENTIAL          ISC36350
C     TEMPERATURE GRADIENTS.                                            ISC36360
C     DEFAULT VALUES FOR PDEF IN SUBROUTINE INCHK                       ISC36370
      DATA DTHDEF /24*0.0,6*.02,6*.035/                                 ISC36380
C                                                                       ISC36390
      END                                                               ISC36400
C                                                                       ISC36410
      SUBROUTINE URBNYZ (X,KST,SY,SZ)                                   ISC36420
C** SUBROUTINE URBNYZ (VERSION 87338) PART OF ISCST                     ISC36430
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C     BRIGGS URBAN PARAMETERS SIGMA-Y,SIGMA-Z                          ISC36440
C     SIGMA-Y,Z (IN METERS) FROM PASQUILL STABILITY CLASS (KST)        ISC36450
C     AND DISTANCE FROM SOURCE, XM, IN METERS.                         ISC36460
      XM=X*1000.                                                       ISC36470
      GO TO (20,20,30,40,50,50), KST                                   ISC36480
20    SY=0.32*XM/SQRT(1.+0.0004*XM)                                    ISC36490
      SZ=0.24*XM*SQRT(1.+0.001*XM)                                     ISC36500
      GO TO 60                                                         ISC36510
30    SY=0.22*XM/SQRT(1.+0.0004*XM)                                    ISC36520
      SZ=0.2*XM                                                        ISC36530
      GO TO 60                                                         ISC36540
40    SY=0.16*XM/SQRT(1.+0.0004*XM)                                    ISC36550
      SZ=0.14*XM/SQRT(1.+0.0003*XM)                                    ISC36560
      GO TO 60                                                         ISC36570
50    SY=0.11*XM/SQRT(1.+0.0004*XM)                                    ISC36580
      SZ=0.08*XM/SQRT(1.+0.0015*XM)                                    ISC36590
60    IF(SZ .GT. 5000.) SZ=5000.                                       ISC36600
      RETURN                                                           ISC36610
      END                                                              ISC36620
C                                                                      ISC36630
      FUNCTION XVY (SYO,KST)                                           ISC36640
C**** FUNCTION XVY (VERSION 87338) PART OF ISCST                       ISC36650
C        XVY CALCULATES THE VIRTUAL DISTANCE NECESSARY TO              ISC36660
C        ACCOUNT FOR THE INITIAL CROSSWIND DISPERSION.                 ISC36670
C        BASED ON BRIGGS URBAN DISPERSION COEFFCIENTS.                 ISC36680
      DIMENSION A(6)                                                   ISC36690
      DATA A/.32,.32,.22,.16,.11,.11/                                  ISC36700
      DATA B/.0004/                                                    ISC36710
C** DIRECT SOLUTION FOR URBAN DISPERSION                               ISC36720
70    XVY=(B*SYO**2+SQRT(B**2*SYO**4+4.*A(KST)**2*SYO**2))/            ISC36730
     *(2.*A(KST)**2)                                                   ISC36740
C        CONVERT TO KILOMETERS                                         ISC36750
      XVY=XVY/1000.                                                    ISC36760
      RETURN                                                           ISC36770
      END                                                              ISC36780
C                                                                      ISC36790
      FUNCTION XVZ (SZO,KST)                                           ISC36800
C** FUNCTION XVZ (VERSION 87338) PART OF ISCST                         ISC36810
C        XVZ CALCULATES THE VIRTUAL DISTANCE NECESSARY                 ISC36820
C        TO ACCOUNT FOR THE INITIAL VERTICAL DISPERSION.               ISC36830
C        BASED ON BRIGGS URBAN DISPERSION COEFFCIENTS                  ISC36840
      DIMENSION C(6),D(6)                                              ISC36850
      DATA C /1.E06,1.E06,.20,.14,.08,.08/                             ISC36860
      DATA D /1.E09,1.E09,0.,.0003,.0015,.0015/                        ISC36870
C     DIRECT SOLUTION FOR URBAN DISPERSION                             ISC36880
170   GO TO (180,180,190,200,200,200), KST                             ISC36890
C     SOLUTION TO THE CUBIC EQUATION                                   ISC36900
C     FROM CRC MATHEMATICAL TABLES                                     ISC36910
C     STABILITY A&B (180)                                              ISC36920
180   A=-C(KST)/3.                                                     ISC36930
      B=(2./27.-(SZO/240.)**2)*D(KST)                                  ISC36940
      S=B**2/4.+A**3/27.                                               ISC36950
      IF(S .LT. 0.) GO TO 185                                          ISC36960
      S=SQRT(S)                                                        ISC36970
      E=1./3.                                                          ISC36980
      BA=(-B/2.+S)**E                                                  ISC36990
      BB=(-B/2.-S)**E                                                  ISC37000
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      Y=BA+BB                                                           ISC37010
182   XVZ=Y-1000./3.                                                    ISC37020
      XVZ=XVZ/1000.                                                     ISC37030
      RETURN                                                            ISC37040
185   CS=(SZO/240.)**2*27./2.-1.                                        ISC37050
      TH=ACOS(CS)/3.                                                    ISC37060
      Y=2./3.*COS(TH)*1.E03                                             ISC37070
      GO TO 182                                                         ISC37080
C     STABILITY C(190)                                                  ISC37090
190   XVZ=SZO/C(KST)                                                    ISC37100
      XVZ=XVZ/1000.                                                     ISC37110
      RETURN                                                            ISC37120
C     STABILITY D,E,&F (200)                                            ISC37130
200   XVZ=(D(KST)*SZO**2+SQRT(D(KST)**2*SZO**4+4.*C(KST)**2             ISC37140
     **SZO**2))/(2.*C(KST)**2)                                          ISC37150
      XVZ=XVZ/1000.                                                     ISC37160
      RETURN                                                            ISC37170
       END                                                              ISC37180
C                                                                       ISC37190
      SUBROUTINE URBBAR(XB,BB,IST,IXDIST,IFLAG,XZ)                      ISC37200
C** SUBROUTINE URBBAR (VERSION 87338) PART OF ISCST                     ISC37210
C     IF IFLAG = 1, NOTHING IS DONE                                     ISC37220
C     IF IFLAG = 2, CALCULATE AVERAGE 'B' ONLY.                         ISC37230
C     IF IFLAG = 3, CALCULATE EFFECTIVE DOWNWIND DISTANCE INDEX IXDIST  ISC37240
C                   AS A FUNCTION OF XB, XZ AND STABILITY.              ISC37250
C                                                                       ISC37260
C** SUBROUTINE IS CALLED TWICE, FIRST TO CALCULATE DOWNWIND             ISC37270
C** INDEX, THEN TO CALCULATE BBAR BASED ON BRIGGS URBAN DISP COEFFS.    ISC37280
C                                                                       ISC37290
      DIMENSION       B(38),X1(10,6),INDSGZ(6),XZ(38)                   ISC37300
C                                                                       ISC37310
      DATA INDSGZ /0,9,12,13,19,28/                                     ISC37320
      DATA X1 /.1,                                                      ISC37330
     1         .15,.2,.25,.3,.4,.5,3.11,1.E20,1*0.,  .2,.4,1.E20,7*0.,  ISC37340
     1 1.E20,9*0.,  .3,1.,3.,10.,30.,1.E20,4*0., .1,.3,1.,2.,4.,10.,20.,ISC37350
     2 40.,1.E20,1*0.,  .2,.7,1.,2.,3.,7.,15.,30.,60.,1.E20/            ISC37360
C                                                                       ISC37370
C**   VALUES OF A AND B FOR URBAN SIGMAS CALCULATED USING               ISC37380
C**   LEAST SQUARES FIT OF Y=A*X**B TO TWO KNOWN SIGMA VALUES           ISC37390
C                                                                       ISC37400
      DATA B/1.05481,1.05481,1.07397,1.09147,1.10755,1.12880,1.15459,   ISC37410
     *    1.27573,1.39840,  1.06277,1.11120,1.19463,  1.0,             ISC37420
     *    .97423,.92683,.82729,.69084,.58298,.54401,                   ISC37430
     *    .89450,.89450,.77378,.66096,.59632,.54890,.52290,.51173,     ISC37440
     *    .50737,  .91156,.81821,.72180,.66096,.60730,.56473,          ISC37450
     *    .53115,.51551,.50788,.50452/                                 ISC37460
      GOTO (60,90,10,10) , IFLAG                                        ISC37470
C     NOTE THAT STABILITY CATEGORY C HAS ONLY 1 DISTANCE CATEGORY.      ISC37480
   10 IF(IST .NE. 3) GOTO 20                                            ISC37490
      IXDIST = 13                                                       ISC37500
      RETURN                                                            ISC37510
   20 X = XB                                                            ISC37520
      I = 1                                                             ISC37530
      II = 0                                                            ISC37540
   30 IF(X-X1(I,IST) .LE. 0.0) GOTO 40                                  ISC37550
      I = I + 1                                                         ISC37560
      GOTO 30                                                           ISC37570
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   40 IF(I-II) 50,60,70                                                    ISC37580
   50 IXDIST = IXDIST - 1                                                  ISC37590
   60 RETURN                                                               ISC37600
   70 I = I                                                                ISC37610
      IXDIST = INDSGZ(IST) + I                                             ISC37620
      IF (IFLAG .GT. 3) RETURN                                             ISC37630
      X=XB+XZ(IXDIST)                                                      ISC37640
      GOTO 30                                                              ISC37650
C     CALCULATE AVERAGE 'B'.                                               ISC37660
   90 BB = 0.0                                                             ISC37670
      I = IXDIST - INDSGZ(IST)                                             ISC37680
      DO 100 J = 1,I                                                       ISC37690
      I1 = INDSGZ(IST) + J                                                 ISC37700
  100 BB = BB + B(I1)                                                      ISC37710
      BB = BB/FLOAT(I)                                                     ISC37720
      RETURN                                                               ISC37730
      END                                                                  ISC37740
C                                                                          ISC37750
      SUBROUTINE NMCALM(IDY)                                               ISC37760
C     SUBROUTINE NMCALM (VERSION 87338) PART OF ISCST                      ISC37770
C                                                                          ISC37780
C     SUBROUTINE TO DETERMINE THE NUMBER OF CALM HOURS                     ISC37790
C     FOR EACH AVERAGING PERIOD PER DAY.  A CALM HOUR IS                   ISC37800
C     DIAGNOSED AS AN HOUR HAVING A WIND SPEED OF 1.0 M/SEC                ISC37810
C     AND THE SAME WIND DIRECTION AS THE HOUR BEFORE.                      ISC37820
C     USED IF ISW(27) = 1                                                  ISC37830
C     CREATED BY TRC ENVIRONMENTAL CONSULTANTS                             ISC37840
C     JULY 1985                                                            ISC37850
      INTEGER TITLE                                                        ISC37860
      COMMON /LOGIX/ ISW(40),NSOURC,NXPNTS,NYPNTS,NXWYPT,NGROUP,           ISC37870
     1 NSOGRP(150),IDSOR(200),IPERD,NPNTS,NAVG,NHOURS,NDAYS,NTDAY,LINE,    ISC37880
     2 IO,IN,TITLE(15),IQUN(3),ICHIUN(7),CONDEP(6),LIMIT,MIMIT             ISC37890
      COMMON /MET/ IDAY(366),ISTAB(24),AWS(24),TEMP(24),AFV(24),           ISC37900
     1 AFVR(24),HLH(24,2),P(24),DTHDZ(24),DECAY(24),PDEF(6,6),             ISC37910
     2 DTHDEF(6,6),ZR,DDECAY,IMET,ITAP,TK,UCATS(5)                         ISC37920
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,          ISC37930
     *NCMYR,IFLAGC(8),NCM4(6)                                              ISC37940
C                                                                          ISC37950
C     SET CALM ARRAY TO ZERO FOR THE DAY                                   ISC37960
      DO 100 I=1,24                                                        ISC37970
      NC(I)=0                                                              ISC37980
  100 CONTINUE                                                             ISC37990
C                                                                          ISC38000
C     DETERMINE CALM HOURS                                                 ISC38010
C                                                                          ISC38020
      IPRINT=0                                                             ISC38030
      DO 200 J=1,24                                                        ISC38040
      TAFV=ABS(OLDAFV-AFV(J))                                              ISC38050
      IF(AWS(J) .LT. 1.01 .AND. TAFV .LT. 0.01) THEN                       ISC38060
      NC(J)=1                                                              ISC38070
      IPRINT=1                                                             ISC38080
      NCMYR=NCMYR+1                                                        ISC38090
      END IF                                                               ISC38100
C     RESET OLD WIND DIRECTION                                             ISC38110
      OLDAFV=AFV(J)                                                        ISC38120
  200 CONTINUE                                                             ISC38130
C                                                                          ISC38140
```

```
      IF(IPRINT .EQ. 1) WRITE(IO,1000) IDY,(NC(I),I=1,24)                ISC38150
 1000 FORMAT(1X,25H* CALM HOURS (=1) FOR DAY,I4,2H *,24I3)               ISC38160
C                                                                       ISC38170
C     NOW HAVE CALM HOURS DETERMINED                                    ISC38180
C     SET COUNTERS FOR EACH AVERAGING PERIOD                            ISC38190
C     AT MAXIMUM VALUE AND DETERMINE NUMBER OF                          ISC38200
C     NON CALM HOURS FOR SPECIFIED AVERAGING PERIODS.                   ISC38210
C     THE ONLY ONES THAT VARY ARE 4, 6, 8, 12, AND 24 HOUR              ISC38220
C     AVERAGES.  SET COUNTERS TO MAXIMUM PERMISSIBLE VALUES.            ISC38230
C                                                                       ISC38240
      DO 300 I=1,5                                                      ISC38250
      IF(ISW(I+9) .NE. 1) GO TO 300                                     ISC38260
      GO TO (205,210,220,230,240),I                                     ISC38270
C     4-HR AVERAGE                                                      ISC38280
  205 DO 206 J=1,6                                                      ISC38290
  206 NCM4(J)=4                                                         ISC38300
      DO 207 K=4,24,4                                                   ISC38310
      N=K-3                                                             ISC38320
      DO 208 L=N,K                                                      ISC38330
      KK=K/4                                                            ISC38340
  208 IF(NC(L).EQ.1) NCM4(KK)=NCM4(KK)-1                                ISC38350
      IF(NCM4(KK).LT.3) NCM4(KK)=3                                      ISC38360
  207 CONTINUE                                                          ISC38370
      GO TO 300                                                         ISC38380
C     6-HOUR AVERAGE                                                    ISC38390
  210 DO 211 J=1,4                                                      ISC38400
      NCM6(J)=6                                                         ISC38410
  211 CONTINUE                                                          ISC38420
      DO 215 K=6,24,6                                                   ISC38430
      N=K-5                                                             ISC38440
      DO 213 L=N,K                                                      ISC38450
      KK=K/6                                                            ISC38460
      IF(NC(L) .EQ. 1) NCM6(KK)=NCM6(KK)-1                              ISC38470
  213 CONTINUE                                                          ISC38480
      IF(NCM6(KK) .LT. 5) NCM6(KK)=5                                    ISC38490
  215 CONTINUE                                                          ISC38500
      GO TO 300                                                         ISC38510
C     8-HOUR AVERAGE                                                    ISC38520
  220 DO 221 J=1,3                                                      ISC38530
      NCM8(J)=8                                                         ISC38540
  221 CONTINUE                                                          ISC38550
      DO 225 K=8,24,8                                                   ISC38560
      N=K-7                                                             ISC38570
      DO 223 L=N,K                                                      ISC38580
      KK=K/8                                                            ISC38590
      IF(NC(L) .EQ. 1) NCM8(KK)=NCM8(KK)-1                              ISC38600
  223 CONTINUE                                                          ISC38610
      IF(NCM8(KK) .LT. 6) NCM8(KK)=6                                    ISC38620
  225 CONTINUE                                                          ISC38630
      GO TO 300                                                         ISC38640
C     12-HOUR AVERAGE                                                   ISC38650
  230 DO 231 J=1,2                                                      ISC38660
      NCM12(J)=12                                                       ISC38670
  231 CONTINUE                                                          ISC38680
      DO 235 K=12,24,12                                                 ISC38690
      N=K-11                                                            ISC38700
      DO 233 L=N,K                                                      ISC38710
```

```
      KK=K/12                                                          ISC38720
      IF(NC(L) .EQ. 1) NCM12(KK)=NCM12(KK)-1                           ISC38730
233   CONTINUE                                                         ISC38740
      IF(NCM12(KK) .LT. 9) NCM12(KK)=9                                 ISC38750
235   CONTINUE                                                         ISC38760
      GO TO 300                                                        ISC38770
C     24-HOUR AVERAGE                                                  ISC38780
240   NCM24=24                                                         ISC38790
      DO 245 K=1,24                                                    ISC38800
      IF(NC(K) .EQ. 1) NCM24=NCM24-1                                   ISC38810
245   CONTINUE                                                         ISC38820
      IF(NCM24 .LT. 18) NCM24=18                                       ISC38830
300   CONTINUE                                                         ISC38840
C                                                                      ISC38850
C     ALL COUNTERS ARE NOW SET                                         ISC38860
C     RETURN TO MAIN PROGRAM                                           ISC38870
      RETURN                                                           ISC38880
      END                                                              ISC38890
C                                                                      ISC38900
      SUBROUTINE AVCALM(I,IHR,A1)                                      ISC38910
C     SUBROUTINE AVCALM (VERSION 87338) PART OF ISCST                  ISC38920
C     SUBROUTINE TO DETERMINE THE MULTIPLIER (1/SUM) FOR               ISC38930
C     EACH AVERAGING PERIOD                                            ISC38940
C     ONLY NEED TO CHANGE MULTIPLIER FOR 4, 6, 8, 12, AND 24           ISC38950
C     HOUR AVERAGES IF CALM OPTION IS SELECTED.                        ISC38960
C                                                                      ISC38970
      DIMENSION N4(24),N6(24),N8(24),N12(24)                           ISC38980
      COMMON /CALM/ NC(24),OLDAFV,NCM6(4),NCM8(3),NCM12(2),NCM24,      ISC38990
     *NCMYR,IFLAGC(8),NCM4(6)                                          ISC39000
      DATA N6/6*1,6*2,6*3,6*4/,N8/8*1,8*2,8*3/,N12/12*1,12*2/          ISC39010
      DATA N4/4*1,4*2,4*3,4*4,4*5,4*6/                                 ISC39020
C                                                                      ISC39030
      J=I-3                                                            ISC39040
      GO TO (10,20,30,40,50),J                                         ISC39050
C     4-HR AVERAGE                                                     ISC39060
 10   L=N4(IHR)                                                        ISC39070
      A1=1./NCM4(L)                                                    ISC39080
      RETURN                                                           ISC39090
C     6-HOUR AVERAGE                                                   ISC39100
20    L=N6(IHR)                                                        ISC39110
      A1=1./NCM6(L)                                                    ISC39120
      RETURN                                                           ISC39130
C     8-HOUR AVERAGE                                                   ISC39140
30    L=N8(IHR)                                                        ISC39150
      A1=1./NCM8(L)                                                    ISC39160
      RETURN                                                           ISC39170
C     12-HOUR AVERAGE                                                  ISC39180
40    L=N12(IHR)                                                       ISC39190
      A1=1./NCM12(L)                                                   ISC39200
      RETURN                                                           ISC39210
C     24-HOUR AVERAGE                                                  ISC39220
50    A1=1./NCM24                                                      ISC39230
      RETURN                                                           ISC39240
      END                                                              ISC39250
C                                                                      ISC39260
      SUBROUTINE MPR1(KST,TS,TEMP,F,D,VS,UPL,DELH,DTHDZ,DISTF)         ISC39270
C     SUBROUTINE MPR1 (VERSION 87338) PART OF ISCST                    ISC39280
```

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C     MAJOR PORTIONS OF THIS CODE CAME FROM THE                          ISC39290
C     MPTF2 MODEL.                                                      ISC39300
C        PLUME RISE CALCULATION                                         ISC39310
      DELT=TS-TEMP                                                      ISC39320
      IF (KST.GT.4) GO TO 70                                            ISC39330
C        PLUME RISE FOR UNSTABLE CONDITIONS                             ISC39340
      IF (TS.LT.TEMP) GO TO 80                                          ISC39350
      IF (F.GE.55.) GO TO 60                                            ISC39360
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)        ISC39370
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC39380
C        BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.            ISC39390
      DTHB=0.0297*TS*VS**0.33333/D**0.66667                             ISC39400
      IF (DELT.LT.DTHB) GO TO 80                                        ISC39410
C        DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)           ISC39420
C        BRIGGS(1971) EQN. 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR  ISC39430
C        DISTF IN KILOMETERS                                            ISC39440
      DISTF=0.049*F**0.625                                              ISC39450
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F<55. ISC39460
      DELH=21.425*F**0.75/UPL                                           ISC39470
      GO TO 100                                                         ISC39480
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)        ISC39490
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OFISC39500
C         BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.           ISC39510
60    DTHB=0.00575*TS*VS**0.66667/D**0.33333                            ISC39520
      IF (DELT.LT.DTHB) GO TO 80                                        ISC39530
C        DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)          ISC39540
C        BRIGGS(1971) EQN. 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR.ISC39550
C        DISTF IN KILOMETERS                                            ISC39560
      DISTF=0.119*F**0.4                                                ISC39570
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F>55. ISC39580
      DELH=38.71*F**0.6/UPL                                             ISC39590
      GO TO 100                                                         ISC39600
C        PLUME RISE FOR STABLE CONDITIONS.                              ISC39610
 70   S=9.80616*DTHDZ/TEMP                                             ISC39620
      IF (TS.LT.TEMP) GO TO 90                                          ISC39630
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)      ISC39640
C        FOUND BY EQUATING BRIGGS(1975) EQ 59, P. 96 FOR STABLE BUOYANCYISC39650
C        RISE WITH BRIGGS(1969) EQ 4.28, P. 59 FOR STABLE MOMENTUM RISE.ISC39660
      DTHB=0.019582*TEMP*VS*SQRT(S)                                     ISC39670
      IF (DELT.LT.DTHB) GO TO 90                                        ISC39680
C        STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW  ISC39690
C        ENOUGH TO REQUIRE STABLE RISE IN CALM CONDITIONS.)             ISC39700
C        BRIGGS(1975) EQ 59, PAGE 96.                                   ISC39710
      DELH=2.6*(F/(UPL*S))**0.333333                                    ISC39720
C        COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM. ISC39730
      DISTF=0.0020715*UPL/SQRT(S)                                       ISC39740
      GO TO 100                                                         ISC39750
C        UNSTABLE-NEUTRAL MOMENTUM RISE                                 ISC39760
C        BRIGGS(1969) EQN. 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4;ISC39770
C        TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) P. 78,ISC39780
C         FIGURE 4.)                                                    ISC39790
 80   DELH=3.*VS*D/UPL                                                  ISC39800
      DISTF=0.                                                          ISC39810
      GO TO 100                                                         ISC39820
C        STABLE MOMENTUM RISE                                           ISC39830
 90   DHA=3.*VS*D/UPL                                                   ISC39840
C        BRIGGS(1969) EQUATION 4.28, PAGE 59                            ISC39850
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      DELH=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667        ISC39860
      IF (DHA.LT.DELH) DELH=DHA                                          ISC39870
      DISTF=0.                                                           ISC39880
C        STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH       ISC39890
C        OTHER RECEPTORS.                                                ISC39900
  100 RETURN                                                             ISC39910
      END                                                                ISC39920
C                                                                        ISC39930
      SUBROUTINE BLP (R0,YL,KST,F,FM,X,U,S,BETAJ,RISE)                   ISC39940
C     SUBROUTINE BLP (VERSION 87338) PART OF ISCST                       ISC39 50
C                                                                        ISC39960
C      CALCULATES PLUME RISE AS IN THE BLP MODEL.                        ISC39970
C       SUBROUTINE IS CALLED ONCE TO SET COEF1 AND COEF2 AND ENTERED     ISC39980
C       SEVERAL TIMES LATER AT POINT BLPRIZ TO DETERMINE COEF0.          ISC39990
      REAL R0,YL,F,FM,X,U,S,BETAJ,RISE                                   ISC40000
      INTEGER KST                                                        ISC40010
      SAVE COEF1,COEF2                                                   ISC40020
      DATA PII /0.31831/, PI2I /0.63662/                                 ISC40030
C       5.0 = 3/BETA    (BETA=0.6)                                       ISC40040
      COEF2 = 5.0 * (YL * PII + R0)                                      ISC40050
C       8.33333 = 3/BETA**2  (BETA=0.6)                                  ISC40060
      COEF1 = 8.33333 * R0 * (YL * PI2I + R0)                            ISC40070
      ENTRY BLPRIZ(KST,F,FM,X,U,S,BETAJ,RISE)                            ISC40080
      IF (KST .LE. 4) THEN                                               ISC40090
C       0.72 = 2*BETA**2                                                 ISC40100
      COEF0 = (3.0*X/(U*U)) * (F*X/(0.72*U) + FM*BETAJ)                  ISC40110
      ELSE                                                               ISC40120
      COEF0 = 16.6667*F/(U*S) + 3.0*FM/(BETAJ*U*SQRT(S))                 ISC40130
     1* SIN(SQRT(S)*X/U)                                                 ISC40140
      ENDIF                                                              ISC40150
      COEF0 = -COEF0                                                     ISC40160
      CALL CUBIC (COEF2,COEF1,COEF0,RISE)                                ISC40170
      RETURN                                                             ISC40180
      END                                                                ISC40190
C                                                                        ISC40200
      SUBROUTINE CUBIC(A,B,C,Z)                                          ISC40210
C     SUBROUTINE CUBIC (VERSION 87338) PART OF ISCST                     ISC40220
C                                                                        ISC40230
C                                                                        ISC40240
C     SOLVES FOR ONE ROOT OF THE CUBIC EQUATION:                         ISC40250
C     Z**3 + A*Z**2 + B*Z + C = 0                                        ISC40260
C                                                                        ISC40270
      IMPLICIT REAL*8 (A-H,O-Z)                                          ISC40280
      REAL A,B,C,Z                                                       ISC40290
      DATA ONE /1.0/                                                     ISC40300
      A3=A/3.                                                            ISC40310
      AP=B-A*A3                                                          ISC40320
      BP=2.*A3**3-A3*B+C                                                 ISC40330
      AP3=AP/3.                                                          ISC40340
      BP2=BP/2.                                                          ISC40350
      TROOT=BP2*BP2+AP3*AP3*AP3                                          ISC40360
      IF(TROOT.LE.0.0)GO TO 50                                           ISC40370
      TR= SQRT(TROOT)                                                    ISC40380
      APP=(-BP2+TR)**0.333333                                            ISC40390
      BSV=-BP2-TR                                                        ISC40400
      IF(BSV.EQ.0.0)GO TO 45                                             ISC40410
      SGN= SIGN(ONE,BSV)                                                 ISC40420
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```
      BPP=SGN*( ABS(BSV))**0.333333                                    ISC40430
      Z=APP+BPP-A3                                                     ISC40440
      RETURN                                                           ISC40450
45    CONTINUE                                                         ISC40460
C     BSV (& BPP) = 0.0                                                ISC40470
      Z=APP-A3                                                         ISC40480
      RETURN                                                           ISC40490
50    CM=2.* SQRT(-AP3)                                                ISC40500
      ALPHA= ACOS(BP/(AP3*CM))/3.                                      ISC40510
      Z=CM* COS(ALPHA)-A3                                              ISC40520
      RETURN                                                           ISC40530
      END                                                              ISC40540
```

# APPENDIX B

# COMPLETE FORTRAN LISTING OF THE

# INDUSTRIAL SOURCE COMPLEX

# LONG TERM MODEL (ISCLT)

# COMPUTER PROGRAM

```
C                   ISCLT (DATED 87352)                                     ISC00010
C                   AN AIR QUALITY DISPERSION MODEL IN                      ISC00020
C                   SECTION1.  GUIDELINE MODELS                             ISC00030
C                   IN UNAMAP (VERSION 6) JAN. 88.                          ISC00040
C                   SOURCE:  FILE 7 ON UNAMAP MAGNETIC TAPE FROM NTIS.      ISC00050
C                                                                           ISC00060
C******       INDUSTRIAL SOURCE COMPLEX LONG TERM MODEL                     ISC00070
C                   SOURCE: FILE 7 ON UNAMAP MAGNETIC TAPE FROM NTIS.       ISC00080
C     THIS VERSION OF ISCLT WAS PREPARED IN 1987                            ISC00090
C     BY TRC ENVIRONMENTAL CONSULTANTS INC. FROM THE                        ISC00100
C     VERSION CONTAINED IN UNAMAP VERSION 6.                                ISC00110
C     THE FOLLOWING FEATURES HAVE BEEN ADDED:                               ISC00120
C        OPTION FOR BRIGGS URBAN DISPERSION COEFFICIENTS.                   ISC00130
C        A PLUME RISE FORMULATION THAT IS                                   ISC00140
C        CONSISTENT WITH THE MPTER MODEL.                                   ISC00150
C        OPTION FOR BUOYANCY INDUCED DISPERSION, ISW(21).                   ISC00160
C        THE MINIMUM SOURCE-RECEPTOR DISTANCE HAS                           ISC00170
C        BEEN REDUCED FROM 100M TO 1M.                                      ISC00180
C        REVISIONS THROUGH H.E. CRAMER CO.'S                                ISC00190
C        UPDATE PACKAGE HAVE BEEN INCLUDED.                                 ISC00200
C        POLLUTANT INDICATOR OPTION, ISW(23).                               ISC00210
C        A " REGULATORY DEFAULT OPTION" SWITCH, ISW(22).                    ISC00220
C        DEFAULT WIND PROFILE COEFFICIENTS FOR                              ISC00230
C        RURAL AND URBAN OPTIONS.                                           ISC00240
C        RECEPTORS BELOW PLANT GRADE ARE TREATED IN                         ISC00250
C        THE SAME MANNER AS RECEPTORS ABOVE                                 ISC00260
C        PLANT GRADE.                                                       ISC00270
C        A TERRIN TRUNCATION ALGORITHM FOR RECEPTORS ABOVE                  ISC00280
C        STACK HEIGHT.                                                      ISC00290
C        AN INPUT DEBUG OPTION  (ISW(24)) HAS BEEN ADDED.                   ISC00300
C        ABOVE GROUND (FLAGPOLE) RECEPTORS MAY NOW BE MODELLED.             ISC00310
C        DIRECTION SPECIFIC BUILDING DOWNWASH WITH A LINEAR DECAY AD-       ISC00320
C        JUSTMENT TO PLUME HEIGHT AND AN ADJUSTMENT TO PLUME RISE ARE       ISC00330
C        NOW PERFORMED FOR REGULATORY USE.                                  ISC00340
C                                                                           ISC00350
      COMMON CORE(40000)                                                    ISC00360
C                                                                           ISC00370
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NOWYPT,NSEASN,NSPEED,NSTBLE,       ISC00380
     1NSCTOR,ISW(25),UNITS(20),TITLE(20),NOFILE                             ISC00390
      COMMON /MET/ FREQ(6,16,24),TA(6,4),HM(6,6,4),DPDZ(6,6),UBAR(6),       ISC00400
     1P(6,6),PHI(16),ROTATE,G,ZR,DECAY,TK                                   ISC00410
      COMMON /REST/ IUNT,JUNT,NOXYY,NOXYYP,ISTBLE(6),IFLG3,LINE,NLINES,     ISC00420
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC00430
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC00440
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NOWY,IMAKSW(16)                      ISC00450
      DIMENSION JSW(25),MSOR(72),NSOR(72),ITEMP(200)                        ISC00460
      EQUIVALENCE (ITEMP(1),FREQ(1,1,1)),(ITEMP(1),JSW(1)),(ITEMP(26),MSISC00470
     1OR(1)),(NSOURC,NSOR(1))                                               ISC00480
      INTEGER TITLE,UNITS                                                   ISC00490
      DATA NOCOMB/20*0/ J5/4N    /                                          ISC00500
C                                                                           ISC00510
C                                                                           ISC00520
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C                                                                       ISC00530
C                                                                       ISC00540
C     THIS COMPUTER PROGRAM IS DESIGNED TO CALCULATE THE AVEPAGE        ISC00550
C     SEASONAL AND/OR ANNUAL GROUND LEVEL OR ELEVATED CONCENTRATION OR  ISC00560
C     TOTAL DEPOSITION FROM MULTIPLE CONTINUOUS POINT,VOLUME AND/OR AREAISC00570
C     SOURCES. THE CALCULATION GRID SYSTEM CAN BE A CARTESIAN COORDINATEISC00580
C     SYSTEM WITH 0 DEGREES NORTH AS THE POSITIVE Y AXIS AND 90 DEGREES ISC00590
C     EAST AS THE POSITIVE X AXIS OR A POLAR COORDINATE SYSTEM WITH X   ISC00600
C     AS THE AXIS OF RADIAL ARCS AND Y AS THE AXIS OF AZIMUTH BEARINGS  ISC00610
C     WITH 0 DEGREES AS NORTH INCREASING POSITIVELY IN A CLOCKWISE      ISC00620
C     DIRECTION. ALSO, PROVISION IS MADE FOR SPECIAL DISCRETE           ISC00630
C     X,Y RECEPTOR POINTS THAT MAY CORRESPOND TO SAMPLER SITES, POINTS  ISC00640
C     OF MAXIMA OR SPECIAL POINTS OF INTEREST. SOURCES CAN BE           ISC00650
C     POSITIONED ANYWHERE RELATIVE TO THE GRID SYSTEM.                  ISC00660
C                                                                       ISC00670
C                                                                       ISC00680
C     THIS COMPUTER PROGRAM IS WRITTEN IN STANDARD FORTRAN 77 AND IS    ISC00690
C     DESIGNED FOR USE ON MOST MEDIUM SIZED COMPUTERS (IBM 360,370 -    ISC00700
C     CDC 6000 SERIES, UNIVAC 1100 SERIES, ETC). ALL ALPHANUMERIC       ISC00710
C     (HOLLERITH) INFORMATION IS STORED 4 CHARACTERS (BYTES) TO AN      ISC00720
C     INTEGER WORD. ALSO, THE VALUES OF SOME VARIABLES IN THE PROGRAM   ISC00730
C     ASSUME AT LEAST A 32 BIT WORD. THE FUNCTION ACOS IS REFERENCED    ISC00740
C     IN THIS PROGRAM IN SUBROUTINE DISTR AND MUST BE CHANGED TO ARCOS  ISC00750
C     FOR IBM FORTRAN COMPILERS.                                        ISC00760
C     BLANK COMMON IS USED TO STORE THE GRID SYSTEM AND ALL CALCULATION ISC00770
C     RECEPTOR POINTS AND THE CONCENTRATION (DEPOSITION) ARRAYS.        ISC00780
C     THE AMOUNT OF CORE IN BLANK COMMON USED BY                        ISC00790
C     EACH VARIABLE IS DETERMINED AT EXECUTION TIME AND THE EQUATION    ISC00800
C     OF CORE USED IN BLANK COMMON IS                                   ISC00810
C                                                                       ISC00820
C          CORE = (NXPNTS*NYPNTS*2*NDGNYPT)+((2*NSEASN*I)*(NXPNTS*NYPNTS*ISC00830
C                 NDGNYPT))                                             ISC00840
C                                                                       ISC00850
C                     WHERE I = 0 IF TERRAIN ELEVATIONS ARE NOT USED    ISC00860
C                                 (ISW(4)=0)                            ISC00870
C                           I = 1 IF TERRAIN ELEVATIONS OR ABOVE        ISC00880
C                                 GROUND RECEPTORS ARE USED             ISC00890
C                                 (ISW(4)=1 OR -1) OR (ISW(25)=1)       ISC00900
C                           I = 2 IF BOTH TERRAIN ELEVATIONS AND        ISC00910
C                                 ABOVE GROUND RECEPTORS ARE USED       ISC00920
C                                 (ISW(4)=1 OR -1) AND (ISW(25)=1)      ISC00930
C                                                                       ISC00940
C     SPECIAL EXCEPTIONS TO THIS EQUATION OCCUR UNDER TWO PROGRAM       ISC00950
C     OPTIONS. THEY ARE NGROUP AND ISW(11) AND MAY SUPERCEDE THE ABOVE  ISC00960
C     EQUATION IF REQUIREMENT C OF EITHER OPTION IS USED.               ISC00970
C     THE VALUE OF CORE MUST BE LESS THAN OR EQUAL TO THE TOTAL SIZE    ISC00980
C     OF THE ARRAY CORE IN BLANK COMMON AT THE BEGINNING OF THIS        ISC00990
C     PROGRAM. ALSO, THE VARIABLE IEND FOLLOWING THE INPUT DATA COMMENT ISC01000
C     CARDS MUST BE SET EQUAL TO THE TOTAL SIZE OF THE ARRAY CORE IN    ISC01010
C     BLANK COMMON.                                                     ISC01020
C                                                                       ISC01030
C                                                                       ISC01040
C                                                                       ISC01050
C                                                                       ISC01060
C*****************LONG TERM ISC MODEL PROGRAM INPUTS *****************ISC01070
C                                                                       ISC01080
C     THE BELOW EXPLANATION OF THE PROGRAM INPUTS IS MEANT FOR THE      ISC01090
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C     EXPERIENCED USER. PLEASE READ THE MAIN PROGRAM DOCUMENTATION      ISC01100
C     CAREFULLY BEFORE USING THIS PROGRAM AS A SINGLE ERROR CAN MAKE    ISC01110
C     THE ENTIRE RESULTS ERRONEOUS.                                     ISC01120
C                                                                       ISC01130
C                                                                       ISC01140
C                                                                       ISC01150
C-CARD GROUP 1 (20A4 FORMAT)                                            ISC01160
C     TITLE - UP TO 80 CHARACTERS OF CASE TITLING INFORMATION           ISC01170
C             (CARD COL. 1-80)                                          ISC01180
C                                                                       ISC01190
C-CARD GROUP 2 (25I2 FORMAT)                                            ISC01200
C     ISW - ARRAY CONTAINING PROGRAM OPTIONS                            ISC01210
C         NOTE - IF USING AN INPUT TAPE OPTIONS ISW(1), (2), (3), AND   ISC01220
C                (4) ARE SET BY THE INPUT TAPE AND THE PROGRAM IGNORES  ISC01230
C                ANY CARD VALUE.                                        ISC01240
C        ISW(1)  - (CARD COL. 2)                                        ISC01250
C                  IF = 0 OR 1 CONCENTRATION IS CALCULATED.             ISC01260
C                 IF = 2 TOTAL DEPOSITION IS CALCULATED.                ISC01270
C                  THIS OPTION IS IGNORED IF USING AN INPUT TAPE.       ISC01280
C        ISW(2)  - (CARD COL. 4)                                        ISC01290
C                  IF = 0 OR 1 THE GRID SYSTEM X AND Y AXES ARE ASSUMED ISC01300
C                         TO DEFINE A CARTESIAN COORDINATE SYSTEM WITH  ISC01310
C                         NEGATIVE X AS WEST (270 DEG), POSITIVE X      ISC01320
C                         AS EAST (90 DEG), NEG. Y AS SOUTH (180 DEG)   ISC01330
C                         AND POS. Y AS NORTH (0 DEG).                  ISC01340
C                  IF = 2 THE GRID SYSTEM X AND Y AXES ARE ASSUMED TO   ISC01350
C                         DEFINE A POLAR COORDINATE SYSTEM WHERE THE X   ISC01360
C                         AXIS DEFINES THE POLAR RADIALS AND THE Y AXIS ISC01370
C                         DEFINES THE ANGULAR COORDINATES (AZIMUTH      ISC01380
C                         BEARING). Y IS MEASURE IN A CLOCKWISE         ISC01390
C                         DIRECTION STARTING AT 0 DEGREES NORTH.        ISC01400
C                   THIS OPTION IS IGNORED IF USING AN INPUT TAPE.      ISC01410
C         ISW(3)  - (CARD COL. 6)                                       ISC01420
C                   IF = 0 OR 1 THE PROGRAM ASSUMES THE SPECIAL DISCRETEISC01430
C                              X,Y CALCULATION RECEPTOR POINTS ARE      ISC01440
C                             IN CARTESIAN COORDINATES.                 ISC01450
C                  IF = 2 THE PROGRAM ASSUMES THE X,Y SPECIAL DISCRETE  ISC01460
C                             CALCULATION RECEPTOR POINTS ARE IN        ISC01470
C                             POLAR COORDINATES.                        ISC01480
C                   THIS OPTION IS IGNORED IF USING AN INPUT TAPE.      ISC01490
C         ISW(4)  - (CARD COL. 8)                                       ISC01500
C                   IF = 0 NO TERRAIN ELEVATION DATA IS READ BY THE     ISC01510
C                          PROGRAM                                      ISC01520
C                  IF = 1 TERRAIN ELEVATION DATA IS READ. IF = -1, THEN ISC01530
C                  ELEVATIONS ARE IN METERS RATHER THAN FEET.           ISC01540
C                   THIS OPTION IS IGNORED BY THE PROGRAM IF USING AN   ISC01550
C                 INPUT TAPE OR FILE.                                   ISC01560
C         ISW(5)  - (CARD COL. 10)                                      ISC01570
C                   IF = 0 NO MASTER SAVE TAPE (SCRATCH TAPE) INPUT OR  ISC01580
C                          OUTPUT IS ASSUMED.                           ISC01590
C                   IF = 1 ALL PROGRAM INPUT DATA, SOURCE DATA AND      ISC01600
C                          CALCULATIONS ARE WRITTEN TO MASTER SAVE TAPE ISC01610
C                          ON FORTRAN LOGICAL UNIT ISW(15). TWO FILE    ISC01620
C                          MARKS ARE WRITTEN AFTER THE LAST RECORD ON   ISC01630
C                          TAPE. THE TAPE IS BINARY AND THE LAST RECORD ISC01640
C                          WRITTEN ON TAPE HAS AN INTEGER 999999 IN WORD ISC01650
C                          1 TO INDICATE END OF DATA.                   ISC01660
C
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C                    - TAPE RECORD -          - CONTENTS -      ISC01670
C                          1       -   COMMON BLOCK /DIM/, 72 WORDSISC01680
C                          2       -   X AXIS AND X SPECIAL POINTS,ISC01690
C                                      NXPNTS+NXWYPT WORDS         ISC01700
C                          3       -   Y AXIS AND Y SPECIAL POINTS,ISC01710
C                                      NYPNTS+NXWYPT WORDS         ISC01720
C                          4       -   TERRAIN ELEVATIONS Z, ONLY  ISC01730
C                                      IF ISW(4) IS GREATER THAN 0.ISC01740
C                          4A      -  ABOVE GROUND RECEPTOR HEIGHTSISC01750
C                                      (RHT), ONLY IF ISW(25) IS   ISC01760
C                                      GREATER THAN 0.             ISC01770
C                          5       -   COMMON BLOCK /MET/, 1576    ISC01780
C                                      WORDS                       ISC01790
C                          6       -   COMMON BLOCK /SORC/, 251     ISC01800
C                                      WORDS, SOURCE RECORD        ISC01810
C                          7       -   CONCENTRATION (DEPOSITION)  ISC01820
C                                      FOR SEASON 1, NXPNTS*NYPNTS ISC01830
C                                      +NXWYPT WORDS.              ISC01840
C                          8       -   CONCENTRATION (DEPOSITION)  ISC01850
C                                      FOR SEASON 2 (IF PRESENT)   ISC01860
C                          9       -   CONCENTRATION (DEPOSITION)  ISC01870
C                                      FOR SEASON 3 (IF PRESENT)   ISC01880
C                         10       -   CONCENTRATION (DEPOSITION)  ISC01890
C                                      FOR SEASON 4 (IF PRESENT)   ISC01900
C                        RECORDS 6 THROUGH 10 ARE REPEATED FOR EACH ISC01910
C                        SOURCE INPUT.                             ISC01920
C                  IF = 2 PROGRAM INPUT DATA, SOURCE DATA, AND PREVIOUS ISC01930
C                         CALCULATIONS ARE READ FROM MASTER SAVE TAPE  ISC01940
C                         ON FORTRAN LOGICAL UNIT ISW(14) FOR UPDATE ANDISC01950
C                         /OR DISPLAY.                              ISC01960
C                  IF = 3 MASTER SAVE TAPES ARE BOTH READ AND WRITTEN  ISC01970
C          ISW(6)  - (CARD COL. 12)                                  ISC01980
C                    IF = 0 DO NOT PRINT INPUT DATA. THIS INCLUDES SOURCEISC01990
C                           DATA.                                   ISC02000
C                    IF = 1 PRINT ALL INPUT DATA EXCEPT SOURCE DATA. ISC02010
C                    IF = 2 PRINT SOURCE INPUT DATA ONLY.            ISC02020
C                    IF = 3 PRINT ALL INPUT DATA.                    ISC02030
C          ISW(7)  - (CARD COL. 14)                                  ISC02040
C                  IF = 1 PRINT SEASONAL CONCENTRATION(DEPOSITION) ONLY ISC02050
C                  IF = 2 PRINT ANNUAL CONCENTRATION (DEPOSITION) ONLY, ISC02060
C                         (USED PRIMARILY WHEN INPUT DATA IS ANNUAL  ISC02070
C                          ONLY)                                    ISC02080
C                  IF = 0 OR 3 BOTH SEASONAL AND ANNUAL CONCENTRATION  ISC02090
C                         (DEPOSITION) ARE PRINTED.                 ISC02100
C          ISW(8)  - (CARD COL. 16)                                  ISC02110
C                    IF = 1 PRINT ONLY THE CONCENTRATION (DEPOSITION)  ISC02120
C                           FROM SELECTED INDIVIDUAL SOURCES. (SEE NOCOMBISC02130
C                           AND IDSORC BELOW).                      ISC02140
C                    IF = 2 PRINT ONLY THE COMBINED CONCENTRATION    ISC02150
C                           (DEPOSITION) SUMMED OVER THE SPECIFIED   ISC02160
C                           SOURCES.                                ISC02170
C                    IF = 0 OR 3 PRINT BOTH SELECTED INDIVIDUAL SOURCES ISC02180
C                           AND THE COMBINED SUM OVER THE SPECIFIED  ISC02190
C                           SOURCES.                                ISC02200
C          ISW(9)  - (CARD COL. 18)                                  ISC02210
C                    USED TO DEFINE THE STABILITY MODE USED IN THE   ISC02220
C                    CALCULATIONS OF THE STANDARD DEVIATIONS OF THE  ISC02230
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C           LATERAL AND VERTICAL CONCENTRATION (DEPOSITION)       ISC02240
C           DISTRIBUTIONS AND THE VIRTUAL DISTANCES.              ISC02250
C           THIS PARAMETER MUST BE SET CORRECTLY IF INPUT DATA    ISC02260
C           CARD SOURCES ARE BEING PROCESSED.                     ISC02270
C           IF = 1 THE PROGRAM ASSUMES URBAN MODE 1 AND D, E AND ISC02280
C                  F CATEGORIES ARE REDEFINED AS D.               ISC02290
C           IF = 2 THE PROGRAM ASSUMES URBAN MODE 2 AND STABILITYISC02300
C                  CATEGORIES 1 AND 2 ARE A, 3 IS B, 4 IS C AND   ISC02310
C                  5 AND 6 ARE D.                                 ISC02320
C           IF = 0, 3 OR BLANK THE PROGRAM ASSUMES RURAL MODE     ISC02330
C                  1 AND DEFINES STABILITY CATEGORIES 1 TO 6 TO   ISC02340
C                  BE A THROUGH F.                                ISC02350
C           IF=4 THE PROGRAM ASSUMES URBAN MODE 3 AND DEFINES     ISC02360
C                  STABILITY CATEGORIES 1 TO 6 TO BE A THROUGH    ISC02370
C                  F. BRIGGS URBAN DISPERSION COEFFICIENTS        ISC02380
C                  ARE USED.                                      ISC02390
C                                                                 ISC02400
C     ISW(10) - (CARD COL. 20)                                    ISC02410
C           ISW(10), ISW(11) AND ISW(12) ARE USED TO SPECIFY HOWISC02420
C         THE PROGRAM IS TO CALCULATE AND DISPLAY MAXIMUM VALUES. ISC02430
C         IF ISW(10) IS LEFT BLANK OR ZERO IS PUNCHED THE MAXIMUM ISC02440
C         10 VALUES OF CONCENTRATION OR DEPOSITION ARE NOT        ISC02450
C         CALCULATED AND THE CONCENTRATION OR DEPOSITION AT ALL   ISC02460
C         INPUT GRID SYSTEM AND SPECIAL DISCRETE RECEPTOR POINTS  ISC02470
C         IS PRINTED.                                             ISC02480
C         IF ISW(10) EQUALS 1 THE MAXIMUM 10 VALUES ARE CALCULATEDISC02490
C         ACCORDING TO ISW(11) AND ISW(12) AND ONLY THESE MAXIMUM ISC02500
C         VALUES ARE PRINTED.                                     ISC02510
C         IF ISW(10) EQUALS 2 THE MAXIMUM 10 VALUES ARE CALCULATEDISC02520
C         ACCORDING TO ISW(11) AND ISW(12) AND PRINTED, AS WELL   ISC02530
C         AS, THE CONCENTRATION OR DEPOSITION AT ALL OTHER INPUT  ISC02540
C         RECEPTOR POINTS.                                        ISC02550
C     ISW(11) - (CARD COL. 22)                                    ISC02560
C           IF SET NON-ZERO THE PROGRAM DETERMINES THE MAX. 10    ISC02570
C         VALUES OF CONCENTRATION OR DEPOSITION FROM THE SET OF   ISC02580
C         INPUT GRID SYSTEM AND ARBITRARILY SPACED RECEPTOR       ISC02590
C         POINTS. (IF NON-ZERO THEN ISW(12) MUST BE ZERO)         ISC02600
C         IF SET EQUAL TO 1 THE MAXIMUM 10 VALUES OF EACH         ISC02610
C         INDIVIDUAL SOURCE AND COMBINED SOURCES ARE CALCULATED   ISC02620
C         AND PRINTED INDEPENDENTLY OF EACH OTHER.                ISC02630
C         IF SET EQUAL TO 2 THE MAXIMUM 10 VALUES OF THE COMBINED ISC02640
C         SOURCES DETERMINES WHICH 10 POINTS OF EACH CONTRIBUTING ISC02650
C         SOURCE TO PRINT.                                        ISC02660
C     *** WARNING - THIS OPTION REQUIRES AT LEAST ONE OF THE      ISC02670
C                   FOLLOWING -                                   ISC02680
C             A - THE PROGRAM USES AN OUTPUT TAPE.                ISC02690
C             B - THE PROGRAM USES AN INPUT TAPE AND NO INPUT     ISC02700
C                 CARD SOURCES.                                   ISC02710
C             C - THE TOTAL NUMBER OF SOURCES USED TO FORM EACH   ISC02720
C                 COMBINATION OF SOURCES FOR MAXIMUM CALCULATIONSISC02730
C                 IS LESS THAN OR EQUAL TO THE MINIMUM OF I AND   ISC02740
C                 J BELOW. COUNT EACH SOURCE ONLY ONCE. I.E.      ISC02750
C                 IF A SOURCE IS IN MORE THAN ONE COMBINATION     ISC02760
C                 ONLY COUNT IT ONCE FOR THIS CHECK.              ISC02770
C                   I AND J ARE -                                 ISC02780
C                   I = (IEND-(NXPNTS+NYPNTS+2*NDAYPT)-K-L)/      ISC02790
C                       (NSEASN*(NXPNTS*NYPNTS+NDAYPT))           ISC02800
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C                    IEND = SIZE OF BLANK COMMON (DESIGN SIZE ISC02010
C                           IS 40000)                          ISC02020
C                    K = NSEASN*(NXPNTS*NYPNTS+NXWYPT)         ISC02030
C                    L = NXPNTS*NYPNTS+NXWYPT                  ISC02040
C                        IF ISW(4)=0                           ISC02050
C                      = 0                                     ISC02060
C                        IF ISW(4) IS NON-ZERO                 ISC02070
C                J = 300                                       ISC02080
C                                                              ISC02090
C       ISW(12) - (CARD COL. 24)                               ISC02900
C             IF SET NON-ZERO THE PROGRAM ASSUMES THE USER IS  ISC02910
C           SPECIFYING THE SET(S) OF 10 RECEPTOR POINTS USED TO ISC02920
C           CALCULATE MAXIMUMS. THE PROGRAM ASSUMES THE USER HAS ISC02930
C           INPUT THESE RECEPTOR POINTS INTO THE ARRAYS FOR    ISC02940
C              SPECIAL DISCRETE POINTS. IF THIS OPTION IS USED ISC02950
C              AND TAPE INPUT IS ALSO USED, CARD GROUPS 6A AND 7A ISC02960
C              BELOW ARE READ BY THE PROGRAM AND REPLACE ALL   ISC02970
C              RECEPTOR POINTS ON THE INPUT TAPE. IF THE INPUT ISC02980
C              TAPE CONTAINS TERRAIN ELEVATIONS CARD GROUP 8A IS ISC02990
C              READ AFTER 7A. ALSO, IF THE INPUT TAPE CONTAINS ISC03000
C              ABOVE GROUND RECEPTORS CARD GROUP 8B IS READ AFTER ISC03010
C              EITHER 7A OR 8A. MAKE SURE NXWYPT SPECIFIES THE ISC03020
C              TOTAL NUMBER OF POINTS. IF THE USER INPUTS ONLY 10 ISC03030
C           POINTS SEASONAL AND ANNUAL CALCULATIONS ARE PERFORMED ISC03040
C           ON THESE 10 POINTS. IF THE USER INPUTS MORE THAN 10 ISC03050
C           POINTS THE PROGRAM ASSUMES THE FIRST 10 ARE FOR SEASON 1ISC03060
C           , THE SECOND 10 ARE FOR SEASON 2, AND THE LAST 10 ARE ISC03070
C           FOR ANNUAL CALCULATIONS. FOR EXAMPLE IF WE HAVE FOUR ISC03080
C           SEASONS OF MET DATA TO INPUT AND SEASONAL AND ANNUAL ISC03090
C           CALCULATIONS ARE PERFORMED ON SEPARATE SETS OF POINTS ISC03100
C           THEN 50 POINTS MUST BE INPUT. IF ONLY SEASONAL CALCS ISC03110
C           WERE PERFORMED ONLY 40 POINTS WOULD BE REQUIRED.   ISC03120
C           IF THE LAST OF THE 10 POINTS IN ANY SET HAVE BOTH X ISC03130
C           AND Y ZERO THEY ARE IGNORED AND LESS THAN 10 ARE   ISC03140
C           ACTUALLY PROCESSED. THE VARIABLE NXWYPT SPECIFIES THE ISC03150
C           TOTAL NUMBER OF POINTS THE USER HAS PROVIDED.      ISC03160
C       ISW(13) - (CARD COL. 25-26)                            ISC03170
C             OPTIONAL PRINT OUTPUT UNIT. IF LEFT BLANK OR ZERO ISISC03180
C           PUNCHED ALL PRINT OUTPUT GOES TO UNIT 6. IF PUNCHED ISC03190
C           NON-ZERO ALL PRINT OUTPUT GOES TO THE SPECIFIED UNIT. ISC03200
C           TWO END OF FILE MARKS ARE WRITTEN AT THE END OF THE ISC03210
C           ALTERNATE PRINT FILE IF A POSITIVE VALUE IS PUNCHED. ISC03220
C           IF A NEGATIVE VALUE IS PUNCHED THE END OF FILE MARKS ISC03230
C           ARE NOT WRITTEN. CAUTION - SOME FORTRAN COMPILERS  ISC03240
C           SPECIFY AN AUTOMATIC WRITE END OF FILE AND REWIND  ISC03250
C           (CLOSE FILES) ON OUTPUT FILES AT THE END OF A PROGRAM ISC03260
C           RUN.                                               ISC03270
C       ISW(14) - (CARD COL. 27-28)                            ISC03280
C             OPTIONAL TAPE INPUT UNIT NUMBER. IF BLANK OR 0 THE ISC03290
C             PROGRAM USES LOGICAL UNIT 2. IF YOU ARE USING A MASSISC03300
C             STORAGE FILE FOR INPUT. YOU MUST PUNCH A NEGATIVE ISC03310
C             VALUE FOR ISW(14). A POSITIVE VALUE SPECIFIES TAPE. ISC03320
C       ISW(15) - (CARD COL. 29-30)                            ISC03330
C             OPTIONAL TAPE OUTPUT UNIT NUMBER. IF BLANK OR 0 THE ISC03340
C             PROGRAM USES LOGICAL UNIT 3. IF YOU ARE USING A MASSISC03350
C             STORAGE FILE FOR OUTPUT YOU MUST PUNCH A NEGATIVE ISC03360
C             VALUE FOR ISW(15). A POSITIVE VALUE SPECIFIES TAPE ISC03370
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C        ISW(16) - (CARD COL. 32)                                          ISC03380
C                  IF LEFT BLANK OR ZERO IS PUNCHED THE PROGRAM STARTS     ISC03390
C                  EACH NEW TABLE OF CONCENTRATION OR DEPOSITION ON        ISC03400
C                  A NEW PAGE. ALSO, SOME CONTINUATIONS OF THE SAME        ISC03410
C                  TABLE ARE STARTED ON A NEW PAGE.                        ISC03420
C                  IF PUNCHED NON-ZERO THE PROGRAM ATTEMPTS TO SAVE        ISC03430
C                  OUTPUT PAPER BY COMPRESSING THE OUTPUT AND              ISC03440
C                  MINIMIZING PAGE EJECTION.                               ISC03450
C        ISW(17) - (CARD COL. 33-34)                                       ISC03460
C                  OPTIONAL NUMBER OF PRINT LINES PER PAGE. THIS VALUE     ISC03470
C                  IS INITIALIZED TO 57 LINES PER PAGE. IF YOUR            ISC03480
C                  INSTALLATION PRINTER IS SET DIFFERENTLY PUNCH THE       ISC03490
C                  CORRECT NUMBER OF LINES PER PAGE.                       ISC03500
C        ISW(18) - (CARD COL 35-36)                                        ISC03510
C                  IF LEFT BLANK OR ZERO THE PROGRAM DOES NOT READ         ISC03520
C                  CARD GROUP 9. (SEE CARD GROUP 9 - FMT)                  ISC03530
C                  IF PUNCHED NON-ZERO CARD GROUP 9 IS READ BY THE         ISC03540
C                  PROGRAM ONLY IF THERE IS NO TAPE INPUT.                 ISC03550
C        ISW(19) - OPTION TO CALCULATE PLUME RISE AS A FUNCTION OF         ISC03560
C                  DOWNWIND DISTANCE FOR STACK SOURCES                     ISC03570
C                  IF = 0 THE PROGRAM CALCULATES FINAL PLUME RISE          ISC03580
C                         INDEPENDENTLY OF DOWNWIND DISTANCE.              ISC03590
C                  IF = 1 THE PLUME RISE CALCULATION IS A FUNCTION         ISC03600
C                         OF DOWNWIND DISTANCE.                            ISC03610
C        ISW(20) - OPTION TO ADD THE BRIGGS (1973) DOWNWASH CORRECTION     ISC03620
C                  FOR STACK SOURCES                                       ISC03630
C                  IF = 0 NO DOWNWASH CORRECTION IS MADE                   ISC03640
C                  IF = 1 THE BRIGGS (1973) DOWNWASH CORRECTION IS         ISC03650
C                         APPLIED TO ALL STACK SOURCES                     ISC03660
C        ISW(21) - OPTION TO INCLUDE BUOYANCY INDUCED DISPERSION           ISC03670
C                  FOR STACK SOURCES.                                      ISC03680
C                  IF=0 BUOYANCY INDUCED DISPERSION IS INCLUDED.           ISC03690
C                  IF=1 BUOYANCY INDUCED DISPERSION IS NOT INCLUDED.       ISC03700
C        ISW(22) -REGULATORY DEFAULT OPTION SWITCH                         ISC03710
C                  WITH THIS FEATURE VARIOUS MODEL OPTIONS ARE             ISC03720
C                  INTERNALLY OVERRIDDEN WITH EPA RECOMMENED               ISC03730
C                  VALUES. THE FOLLOWING PARAMETERS ARE USED WHEN          ISC03740
C                  THE REG. DEFAULT MODE IS CHOSEN:                        ISC03750
C                 -FINAL PLUME RISE                                        ISC03760
C                 -BUOYANCY INDUCED DISPERSION                             ISC03770
C                 -STACK-TIP DOWNWASH                                      ISC03780
C                 -FORCED DEFAULT WIND-PROFILE EXPONENTS                   ISC03790
C                      .07,.07,.10,.15,.35,.55 RURAL MODE,                 ISC03800
C                      .15,.15,.20,.25,.30,.30 URBAN MODES.                ISC03810
C                 -FORCED DEFAULT VALUES FOR VERTICAL POTENTIAL            ISC03820
C                  TEMPERATURE GRADIENTS. (A 0.0, B 0.0, C 0.0             ISC03830
C                  D 0.0, E .02, F .035    K/M)                            ISC03840
C                 -DECAY HALF LIFE OF 4 HOURS ASSIGNED IF SO2              ISC03850
C                  IS MODELLED IN AN URBAN MODE.                           ISC03860
C                  IF=0 THE REGULATORY OPTION IS USED.                     ISC03870
C                  IF=1 THE REG. DEFAULT OPTION IS NOT USED.               ISC03880
C                 -DIRECTION SPECIFIC BUILDING DOWNWASH AND ADJUST-        ISC03890
C                  MENTS TO PLUME RISE AND PLUME HEIGHT ARE USED           ISC03900
C                  WHEN THE PHYSICAL STACK HEIGHT IS LESS THAN             ISC03910
C                  HB+0.5L WHERE HB IS THE BUILDING HEIGHT AND L IS        ISC03920
C                  THE LESSER OF THE BUILDING HEIGHT OR MAXIMUM WIDTH.     ISC03930
C                  IF=0 MODEL USES A REGULATORY DEFAULT MODE               ISC03940
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C                 IF=1 MODEL DOES NOT USE A REGULATORY DEFAULT MODE     ISC03950
C        ISW(23) - POLLUTANT INDICATOR SWITCH.                          ISC03960
C                 IF=0 MODEL ASSUMES SO2 IS BEING MODELLED.             ISC03970
C                 IF=1 MODEL ASSUMES OTHER POLLUTANT IS BEING MODELLED. ISC03980
C        ISW(24) - DEBUG OPTION SWITCH                                  ISC03990
C                 IF=0 MODEL ECHOES CARD INPUT LINE BY LINE. THIS       ISC04000
C                 OPTION IS USEFUL FOR INPUT ERROR DEBUGGING.           ISC04010
C                 IF=1 DEBUG OPTION IS NOT USED.                        ISC04020
C        ISW(25) - RECEPTOR HEIGHT ABOVE GROUND SWITCH                  ISC04030
C                 IF=0 NO RECEPTOR HEIGHTS ABOVE GROUND ARE READ        ISC04040
C                 IF=1 RECEPTOR HEIGHTS ABOVE GROUND IN METERS ARE      ISC04050
C                      READ FOR BOTH GRID AND DISCRETE POINTS.          ISC04060
C                                                                       ISC04070
C-CARD GROUP 3 (10I4)                                                   ISC04 30
C     NSOURC - (CARD COL. 1-4)                                          ISC04090
C              NUMBER OF CARD INPUT SOURCES (UNLIMITED)                 ISC04100
C              IF SET EQUAL TO A NEGATIVE NUMBER THE PROGRAM WILL       ISC04110
C              CONTINUE TO READ SOURCES UNTIL A NEGATIVE SOURCE         ISC04120
C              IDENTIFICATION NUMBER IS READ.                           ISC04130
C     NGROUP - (CARD COL. 5-8)                                          ISC04140
C              NUMBER OF DIFFERENT SOURCE COMBINATIONS (SUM OF SOURCES) ISC04150
C              TO OUTPUT. IF NGROUP IS LEFT BLANK OR PUNCHED ZERO THEN  ISC04160
C              ALL INPUT SOURCES ARE USED TO FORM ANY COMBINED (SUMMED) ISC04170
C              SOURCE OUTPUT AND ANY OUTPUT OF INDIVIDUAL SOURCES. IF   ISC04180
C              NGROUP IS PUNCHED NON-ZERO IT GIVES THE NUMBER OF        ISC04190
C              DIFFERENT SOURCE COMBINATIONS AND THE DETAILS OF THE     ISC04200
C              SOURCE COMBINATIONS ARE READ IN CARD GROUP 4 BELOW.      ISC04210
C              (MAXIMUM = 20)                                           ISC04220
C          ** WARNING - NGROUP CANNOT BE SET TO A NON-ZERO VALUE UNLESS ISC04230
C              ONE OR MORE OF THE FOLLOWING CONDITIONS IS MET -         ISC04240
C                  A - THE PROGRAM IS USING AN OUTPUT TAPE.             ISC04250
C                  B - THE PROGRAM IS USING AN INPUT TAPE WITH NO       ISC04260
C                      CARD SOURCES, NSOURC = 0.                        ISC04270
C                  C - THE TOTAL NUMBER OF INDIVIDUAL SOURCES USED TO   ISC04280
C                      FORM ALL COMBINATIONS DESIRED (COUNT EACH SOURCE ISC04290
C                      ONLY ONCE) IS LESS THAN OR EQUAL TO THE MINIMUM  ISC04300
C                      OF I AND J -                                     ISC04310
C                         WHERE -                                       ISC04320
C                      ** I = (IEND-(NXPNTS+NYPNTS+2*NXWYPT)-K-L)/      ISC04330
C                            (NSEASN*(NXPNTS*NYPNTS+NXWYPT))            ISC04340
C                                                                       ISC04350
C                           IEND = SIZE OF BLANK COMMON (DESIGN SIZE    ISC04360
C                                  = 40000)                             ISC04370
C                           K = NSEASN*(NXPNTS*NYPNTS+NXWYPT)           ISC04380
C                             IF ISW(8) IS NOT 1 OR ISW(11) = 2         ISC04390
C                             = 0                                       ISC04400
C                             IF ISW(8)=1 AND ISW(11) IS NOT 2          ISC04410
C                           L = NXPNTS*NYPNTS+NXWYPT                    ISC04420
C                             IF ISW(7)=1 AND NSEASN>1                  ISC04430
C                      ** J = 300                                       ISC04440
C                                                                       ISC04450
C     NXPNTS - (CARD COL. 9-12)                                         ISC04460
C              NUMBER OF RECEPTOR POINTS IN THE X AXIS OF THE           ISC04470
C              CALCULATION GRID SYSTEM. THIS PARAMETER IS IGNORED IF    ISC04480
C              TAPE INPUT IS BEING USED.                                ISC04490
C               IF NXPNTS IS GREATER THAN 2 AND ONLY TWO VALUES OF X ARE ISC04500
C               INPUT IN CARD GROUP 6, THE PROGRAM ASSUMES X(1) IS THE  ISC04510
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C                FIRST POINT AND USES X(2) AS AN INCREMENT TO GENERATE   ISC04520
C                POINTS X(2) THROUGH X(NXPNTS).                          ISC04530
C                                                                        ISC04540
C     NYPNTS - (CARD COL. 13-16)                                         ISC04550
C              NUMBER OF RECEPTOR POINTS IN THE Y AXIS OF THE            ISC04560
C              CALCULATION GRID SYSTEM. THIS PARAMETER IS IGNORED IF     ISC04570
C              TAPE INPUT IS BEING USED.                                 ISC04580
C               IF NYPNTS IS GREATER THAN 2 AND ONLY TWO VALUES OF Y ARE ISC04590
C               INPUT IN CARD GROUP 7, THE PROGRAM ASSUMES Y(1) IS THE   ISC04600
C               FIRST POINT AND USES Y(2) AS AN INCREMENT TO GENERATE    ISC04610
C               POINTS Y(2) THROUGH Y(NYPNTS)                            ISC04620
C     NDGNYPT - (CARD COL. 17-20) (MUST BE PUNCHED IF ISW(12) > 0)       ISC04630
C               NUMBER OF SPECIAL DISCRETE RECEPTOR CALCULATION          ISC04640
C               POINTS. THESE ARE ADDITIONAL CALCULATION POINTS OR IN    ISC04650
C               LIEU OF THE REGULAR GRID SYSTEM POINTS. ALSO, THIS VALUE ISC04660
C               SPECIFIES THE NUMBER OF POINTS DESIRED FOR MAXIMUMS UNDER ISC04660
C               ISW(12). SEE ISW(12).                                    ISC04670
C                                                                        ISC04680
C     NSEASN - (CARD COL. 21-24)                                         ISC04690
C              NUMBER OF SEASONS IN INPUT METEOROLOGICAL DATA (FREQ, TA, ISC04690
C              HH, ETC.) (MAX = 4). IF YOU HAVE ANNUAL DATA ONLY SET     ISC04700
C              NSEASN EQUAL TO ONE. (DEFAULT = 1). THIS VALUE IS         ISC04710
C              IGNORED IF YOU ARE USING TAPE INPUT.                      ISC04720
C                                                                        ISC04730
C     NSPEED - (CARD COL. 25-28)                                         ISC04740
C              NUMBER OF WIND SPEED CATEGORIES IN THE INPUT              ISC04750
C              METEOROLOGICAL DATA. (MAX. = 6 AND DEFAULT = 6). THIS     ISC04760
C              PARAMETER IS IGNORED IF YOU ARE USING TAPE INPUT.         ISC04770
C                                                                        ISC04780
C     NSTBLE - (CARD COL. 29-32)                                         ISC04790
C              NUMBER OF PASQUILL STABILITY CATEGORIES IN THE INPUT      ISC04800
C              METEOROLOGICAL DATA (FREQ, TA, HH, DPDZ, P).(DEFAULT=6)   ISC04810
C              (MAX. = 6). STABILITY CATEGORIES 1 THROUGH 6 FOR THE      ISC04820
C              METEOROLOGICAL DATA CORRESPONDING TO PASQUILL CATEGORIES  ISC04830
C              A THROUGH F. ON INPUT IF THERE ARE LESS THAN 6 STABILITY   ISC04840
C              CATEGORIES THE PROGRAM ASSUMES THE MISSING CATEGORIES     ISC04850
C              HAVE BEEN COMBINED INTO THE LAST CATEGORY INPUT.          ISC04860
C                                                                        ISC04870
C     NSCTOR - (CARD COL. 33-36)                                         ISC04880
C              NUMBER OF WIND DIRECTION SECTOR CATEGORIES IN THE INPUT   ISC04890
C              FREQUENCY DISTRIBUTION (FREQ). (MAX. = 16) IF LEFT BLANK  ISC04900
C              OR ZERO IS PUNCHED THE PROGRAM ASSUMES 16.                ISC04910
C                                                                        ISC04920
C     NOFILE - (CARD COL. 37-40)                                         ISC04930
C              FILE NUMBER OF DATA SET TO BE WRITTEN TO OUTPUT TAPE      ISC04940
C              (ISW(5)=1 OR 3) OR IF NO OUTPUT FILE IS BEING WRITTEN,    ISC04950
C              THE FILE NUMBER OF THE DATA SET TO BE READ FROM TAPE      ISC04960
C              (ISW(5)=2). THIS PARAMETER MUST BE SPECIFIED IF CONDITION ISC04970
C              A OR CONDITION B IS SELECTED UNDER EITHER ISW(11) OR      ISC04980
C              NGROUP. THE USER MUST POSITION TAPES TO THEIR CORRECT     ISC04990
C              FILE NUMBER PRIOR TO EXECUTION AND ISCLT USES NOFILE TO   ISC05000
C              POSITION THE TAPE IT ASSEMBLES REPORTS FROM DURING        ISC05010
C              EXECUTION. NOFILE DOES NOT APPLY TO MASS-STORAGE FILES    ISC05020
C              AS THESE FILES ARE ASSUMED TO BE ONLY ONE FILE. THE       ISC05030
C              DEFAULT FOR NOFILE IS 1.                                  ISC05040
C                                                                        ISC05050
C-CARD GROUP 4 (20I4) AND (13I6) (THIS CARD GROUP IS NOT READ IF NGROUP   ISC05060
C     ABOVE IS ZERO OR BLANK. CARD GROUP 4 IS ACTUALLY 2 CARD GROUPS.     ISC05070
C     THE FIRST IS THE ARRAY NOCOMB AND THE SECOND IS THE ARRAY IDSORC.   ISC05080
C     NOCOMB - (CARD COL. 1-4,5-8,---,77-80) (1 OR MORE CARDS)           ISC05090
C              ARRAY USED TO SPECIFY THE NUMBER OF SOURCE ID NUMBERS     ISC05100
C              USED TO DEFINE A SOURCE COMBINATION. THE FIRST VALUE      ISC05110
C              PUNCHED ON THIS CARD GIVES THE NUMBER OF VALUES (SOURCE   ISC05120
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C              ID NUMBERS) PUNCHED IN THE FIRST PART OF THE ARRAY IDSORCISC05090
C              BEGIN FOR THE FIRST SOURCE COMBINATION. (MAX = 20 VALUES)ISC05100
C     IDSORC - (C*40 COL. 1-6,7-12,---,73-78) (1 OR MORE CARDS)        ISC05110
C              ARRAY USED TO SPECIFY THE SOURCE ID NUMBERS TO USE IN    ISC05120
C              FORMING THE COMBINED SOURCE OUTPUT AND INDIVIDUAL SOURCE ISC05130
C              OUTPUT. IF A POSITIVE VALUE IS PUNCHED THAT SOURCE IS    ISC05140
C              INCLUDED. IF A NEGATIVE VALUE IS PUNCHED THAT SOURCE IS  ISC05150
C              INCLUDED, AS WELL AS, ALL SOURCES LESS IN ABSOLUTE VALUE ISC05160
C              UP TO AND INCLUDING THE PREVIOUS POSITIVE SOURCE PUNCHED ISC05170
C              IF THERE IS ONE AND IF IT IS PART OF THE SAME GROUP.     ISC05180
C              FOR EXAMPLE ASSUME NGROUP EQUALS 3. ALSO, ASSUME THE     ISC05190
C              VALUES PUNCHED INTO NOCOMB ARE 1, 4, 3 AND THE VALUES    ISC05200
C              PUNCHED INTO IDSORC ARE -32, 7,10,-22,25, -15, 17, 18.   ISC05210
C              THE PROGRAM WILL PRODUCE 3 COMPLETE SETS OF OUTPUT. THE  ISC05220
C              FIRST WILL INCLUDE ALL SOURCES 1 THROUGH 32. THE SECOND  ISC05230
C              WILL INCLUDE SOURCE 7, 10 THROUGH 22 AND 25. THE THIRD   ISC05240
C              OR LAST SET OF OUTPUT WILL INCLUDE SOURCES 1 THROUGH 15  ISC05250
C              AND SOURCES 17 AND 18. NOTE THAT THE SOURCE ID NUMBERS   ISC05260
C              IN EACH GROUP MUST BE IN ASCENDING ABSOLUTE VALUE IN     ISC05270
C              THEIR RESPECTIVE GROUP. ALSO, THESE VALUES ARE THE       ISC05280
C              SOURCE ID NUMBERS YOU HAVE ASSIGNED AND NOT NECESSARILY  ISC05290
C              THE RELATIVE INDEX NUMBER UNLESS ALL SOURCE ID NUMBERS   ISC05300
C              ARE BEING OR HAVE BEEN DEFAULTED. (MAX. NO. OF VALUES    ISC05310
C              IS 200)                                                  ISC05320
C                                                                       ISC05330
C *** NOTE - IF YOU ARE USING TAPE INPUT ONLY CARD GROUPS 6A,7A,8A,8B   ISC05340
C            AND 17 THROUGH 170 CAN BE INPUT AND 6A,7A ARE READ ONLY IF ISC05350
C            ISW(12) = 1 AND NXNYPT IS NON-ZERO,8A IS READ ONLY IF      ISC05360
C            ISW(12) = 1, NXNYPT IS NON-ZERO AND ISW(4) = 1 OR THE INPUTISC05370
C            TAPE CONTAINS TERRAIN ELEVATIONS AND 8B IS READ ONLY IF    ISC05380
C            ISW(12) = 1, NXNYPT IS NON-ZERO AND ISW(25) = 1 OR THE     ISC05390
C            INPUT TAPE CONTAINS ABOVE GROUND RECEPTORS.                ISC05400
C                                                                       ISC05410
C-CARD GROUP 5 (10A4,10A4 FORMAT) (NOT READ IF TAPE INPUT)              ISC05420
C     UNITS - (CARD COL. 1-40 AND 41-80)                                ISC05430
C             THE FIRST 40 CHARACTERS OF UNITS GIVES THE CONCENTRATION  ISC05440
C             (DEPOSITION) OUTPUT UNITS LEFT JUSTIFIED. THE SECOND 40   ISC05450
C             CHARACTERS STARTING IN COL. 41 GIVES THE SOURCE INPUT     ISC05460
C             UNITS. IF THE SOURCE IS AN AREA SOURCE THE PROGRAM        ISC05470
C             AUTOMATICALLY APPENDS '/SQUARE METER' ON THE END OF THE   ISC05480
C             SOURCE INPUT UNITS. THIS CARD IS AUTOMATICALLY FILLED IF  ISC05490
C             THE PARAMETER TK (CARD GROUP 13) BELOW IS DEFAULTED AND   ISC05500
C             CAN BE LEFT BLANK.                                        ISC05510
C                                                                       ISC05520
C     CARD GROUPS 6,7, AND 8 FOR GRID-TYPE RECEPTORS.                   ISC05530
C-CARD GROUP 6 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT OR NXPNTS = 0)   ISC05540
C     X - ARRAY OF NXPNTS POINTS IN ASCENDING ORDER (MINUS TO POS.)     ISC05550
C         DEFINING THE X AXIS OF THE CALCULATION RECEPTOR GRID SYSTEM   ISC05560
C         (METERS). IF ONLY THE FIRST 2 X VALUES ARE NON-ZERO AND NXPNTSISC05570
C         IS GREATER THAN 2 THEN THE PROGRAM ASSUMES THE FIRST POINT    ISC05580
C         IS THE START OF THE AXIS, THE SECOND POINT IS ACTUALLY AN     ISC05590
C         INCREMENT TO GENERATE THE REMAINING POINTS AND THE PROGRAM    ISC05600
C         THEN GENERATES THE X AXIS INTERNALLY. (CARD COL. 1-10,11-20,  ISC05610
C         21-30,---,71-80 ON EACH CARD)                                 ISC05620
C                                                                       ISC05630
C-CARD GROUP 7 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT OR NYPNTS = 0)   ISC05640
C     Y - ARRAY OF NYPNTS POINTS IN ASCENDING ORDER (MINUS TO POS.)     ISC05650
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C         DEFINING THE Y AXIS OF THE CALCULATION RECEPTOR GRID SYSTEM   ISC05660
C         (METERS OR DEGREES IF POLAR SYSTEM). IF ONLY THE FIRST 2 Y    ISC05670
C         VALUES ARE PUNCHED (NON-ZERO) AND NYPNTS IS GREATER THAN 2    ISC05680
C         THEN THE PROGRAM ASSUMES THE FIRST POINT IS THE START OF THE  ISC05690
C         AXIS AND THE SECOND IS ACTUALLY AN INCREMENT USED TO GENERATE ISC05700
C         THE REMAINING POINTS FOR THE AXIS INTERNALLY. (CARD COL. 1-10,ISC05710
C         11-20,---,71-80 ON EACH CARD).                                ISC05720
C                                                                       ISC05730
C-CARD GROUP 8-1 (8F10.0 FORMAT) (READ ONLY IF ISW(4) = 1)              ISC05740
C     Z - ARRAY OF TERRAIN ELEVATIONS FOR THE CALCULATION GRID SYSTEM   ISC05750
C         (FEET).   THE Z VALUES FOR EACH POINT ON THE X AXIS ARE READ  ISC05760
C         FOR EACH VALUE ON THE Y AXIS. START A NEW GROUP OF X AXIS DATAISC05770
C         CARDS FOR EACH Y POINT 1 TO NYPNTS.                           ISC05780
C         (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                 ISC05790
C                                                                       ISC05800
C-CARD GROUP 8-2 (8F10.0 FORMAT) (READ ONLY IF ISW(25) = 1)             ISC05810
C   RHT - ARRAY OF RECEPTOR HEIGHTS ABOVE LOCAL TERRAIN ELEVATIONS      ISC05820
C         FOR THE CALCULATION GRID SYSTEM (METERS).  THE Z VALUES       ISC05830
C         FOR EACH POINT ON THE X AXIS ARE READ FOR EACH VALUE ON       ISC05840
C         THE Y AXIS. START A NEW GROUP OF X AXIS DATA CARDS FOR        ISC05850
C         EACH Y POINT 1 TO NYPNTS.                                     ISC05860
C         (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                 ISC05870
C                                                                       ISC05880
C-CARD GROUPS 6A,7A,8A, AND 8B FOR DISCRETE RECEPTORS.                  ISC05890
C         FORMAT(4F10.0)                                                ISC05900
C         THESE CARDS ARE ONLY READ IF NXYPT IS NON-ZERO.               ISC05910
C         1 CARD IS REQUIRED FOR EACH DISCRETE RECEPTOR.                ISC05920
C         NXYPT CARDS MUST BE INPUT.                                    ISC05930
C         FOR EACH DISCRETE RECEPTOR(EACH CARD) INPUT                   ISC05940
C         X,Y,Z          WHERE:                                         ISC05950
C         X- DISCRETE RECEPTOR X-AXIS LOCATION (METERS)                 ISC05960
C         Y- DISCRETE RECEPTOR Y-AXIS LOCATION (METERS)                 ISC05970
C         Z- DISCRETE RECEPTOR ELEVATION (FEET)                         ISC05980
C         RHT- DISCRETE RECEPTOR HEIGHT ABOVE GROUND (METERS)           ISC05990
C         IF TERRAIN ELEVATIONS ARE NOT TO BE CONSIDERED                ISC06000
C         LEAVE THE THIRD ENTRY ON EACH CARD BLANK. IF ABOVE GROUND     ISC06010
C         RECEPTORS ARE NOT TO BE CONSIDERED LEAVE THE LAST ENTRY       ISC06020
C         ON EACH CARD BLANK.                                           ISC06030
C                                                                       ISC06040
C-CARD GROUP 9 (20A4 FORMAT ) (NOT READ IF TAPE INPUT OR ISW(18)=0)     ISC06050
C     FMT - FORTRAN FORMAT OF THE FREQUENCY OF OCCURRENCE OF SPEED AND  ISC06060
C           DIRECTION 'FREQ'. IF ISW(18)=0 THE PROGRAM DEFAULTS THE     ISC06070
C           FORMAT TO (6F10.0) AND CARD GROUP 9 IS NOT READ. IF         ISC06080
C           ISW(18) IS NON-ZERO THE PROGRAM READS THE FORMAT ON THIS    ISC06090
C           DATA CARD INCLUDING LEADING AND ENDING PARENTHESIS AND USES ISC06100
C           THE INPUT FORMAT READ TO READ CARD GROUP 9A.                ISC06110
C-CARD GROUP 9A (FORMAT FMT USED) (THIS CARD GROUP IS NOT READ IF AN    ISC06120
C                INPUT TAPE IS BEING USED)                              ISC06130
C     FREQ - ARRAY OF FREQUENCY OF OCCURRENCES OF WIND SPEED, WIND      ISC06140
C           DIRECTION, STABILITY AND SEASON EXPRESSED AS A PERCENTAGE   ISC06150
C           OR A FRACTION. THE SUM OF ALL VALUES OF FREQ OVER A SINGLE  ISC06160
C           SEASON MUST BE APPROXIMATELY EQUAL TO 100.0 OR 1.0. THESE   ISC06170
C           VALUES ARE READ WITH NSPEED VALUES PER CARD, NSCTOR CARDS   ISC06180
C           PER STABILITY AND NSTBLE GROUPS OF THESE CARDS PER SEASON   ISC06190
C           1 TO NSEASN.                                                ISC06200
C           NSPEED*NSCTOR*NSTBLE*NSEASN VALUES ARE READ.                ISC06210
C                                                                       ISC06220
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C-CARD GROUP 10 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC06230
C     TA - ARRAY OF AMBIENT AIR TEMPERATURES (DEG K). THERE ARE NSTBLE  ISC06240
C          VALUES READ PER CARD AND NSEASN CARDS READ. IF ANY OF THE    ISC06250
C          SECOND THROUGH NSTBLE VALUES ON A CARD ARE ZERO THE PROGRAM  ISC06260
C          SETS IT EQUAL TO THE LAST NON-ZERO VALUE ENCOUNTERED AS IT   ISC06270
C          SCANS THE DATA CARD FROM LEFT TO RIGHT.                      ISC06280
C          (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)                ISC06290
C                                                                       ISC06300
C-CARD GROUP 11 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC06310
C     MM - ARRAY OF MIXING LAYER HEIGHTS (METERS). THERE ARE NSPEED     ISC06320
C          VALUES READ PER CARD, AND NSTBLE CARDS READ PER SEASON 1 TO  ISC06330
C          NSEASN. IF ANY OF THE SECOND THROUGH NSPEED VALUES ON A CARD ISC06340
C          ARE ZERO, THE PROGRAM SETS IT EQUAL TO THE LAST NON-ZERO     ISC06350
C          VALUE ENCOUNTERED AS IT SCANS THE DATA CARD FROM LEFT TO     ISC06360
C          RIGHT.                                                       ISC06370
C          (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)                ISC06380
C                                                                       ISC06390
C-CARD GROUP 12 (6F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC06400
C     DPDZ - ARRAY OF VERTICAL GRADIENTS OF POTENTIAL TEMP. (DEG/METER).ISC06410
C            THERE ARE NSPEED VALUES READ PER CARD AND NSTBLE CARDS     ISC06420
C            READ. IF ANY VALUE IS INPUT GREATER THAN ZERO THE STABLE   ISC06430
C            PLUME RISE IS USED. IF ANY VALUE IS INPUT LESS THAN ZERO   ISC06440
C            THE ADIABATIC TO UNSTABLE PLUME RISE IS USED. IF A VALUE   ISC06450
C            OF ZERO IS INPUT OR THE VALUE IS LEFT BLANK, THE PROGRAM   ISC06460
C            USES A DEFAULT VALUE. IF THE DEFAULT IS FOR THE FIRST VALUEISC06470
C            ON THE CARD THE DEFAULT VALUE DEPENDS ON STABILITY. IF THE ISC06480
C            STABILITY IS A,B,C OR D A VALUE OF ZERO IS USED. IF THE    ISC06490
C            STABILITY IS E THEN DPDZ = .02, IF F THEN DPDZ = .035. IF  ISC06500
C            THE SECOND THROUGH SIXTH VALUE ON A CARD IS ZERO OR NOT    ISC06510
C            PUNCHED THE PROGRAM SUBSTITUTES THE PREVIOUS VALUE READ    ISC06520
C            FROM THE CARD.                                             ISC06530
C            IF THE REG DEFAULT OPTION IS SELECTED(ISW(22)=0)           ISC06540
C            ANY USER-INPUT VALUES WILL BE REPLACED WITH                ISC06550
C            DEFAULT VALUES.                                            ISC06560
C            (CARD COL. 1-10,11-20,---,51-60 ON EACH CARD)              ISC06570
C                                                                       ISC06580
C-CARD GROUP 13 (5F10.0 FORMAT) (NOT READ IF INPUT TAPE)                ISC06590
C     ROTATE - (CARD COL. 1-10)                                         ISC06600
C              THIS PARAMETER IS USED TO CORRECT FOR ANY DIFFERENCE IN   ISC06610
C              NORTH AS DEFINED BY THE X,Y GRID SYSTEM AND NORTH AS      ISC06620
C              DEFINED BY THE WEATHER STATION AT WHICH THE WIND          ISC06630
C              DIRECTION DATA HAS RECORDED. THE VALUE OF ROTATE IS       ISC06640
C              SUBTRACTED FROM EACH WIND DIRECTION CATEGORY. ROTATE IS   ISC06650
C              POSITIVE IF THE POSITIVE Y AXIS POINTS TO THE RIGHT OF    ISC06660
C              NORTH AS DEFINED BY THE WEATHER STATION AND NEGATIVE WHENISC06670
C              THE POSITIVE Y AXIS POINTS TO THE LEFT.                   ISC06680
C                  THE PROGRAM ASSUMES THAT THE METEOROLOGICAL DATA       ISC06690
C              (WIND DIRECTION) RECORDED AT THE WEATHER STATION IS       ISC06700
C              APPLICABLE AT THE SOURCE LOCATION. MOST WEATHER STATIONS  ISC06710
C              RECORD DIRECTION RELATIVE TO TRUE NORTH AND MOST GRID     ISC06720
C              SYSTEMS ARE RELATIVE TO TRUE NORTH. HOWEVER, SOME WEATHERISC06730
C              STATIONS RECORD DIRECTION RELATIVE TO MAGNETIC NORTH.     ISC06740
C              ALSO, UTM (UNIVERSAL TRANSVERSE MERCATOR) COORDINATES     ISC06750
C              ARE ORIENTED RELATIVE TO TRUE NORTH AT THE CENTER OF THE  ISC06760
C              UTM ZONE, BUT HAS AN INCREASING POS  OR NEG. DECLINATION  ISC06770
C              AS YOU APPROACH THE ENDS OF THE UTM ZONE. A ONE DEGREE     ISC06780
C              ERROR AT 20 KILOMETERS DOWNWIND RESULTS IN AN ERROR OF     ISC06790
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C              349 METERS IN THE LATERAL LOCATION OF THE MAXIMUM.          ISC06800
C                                                                         ISC06810
C     TK - (CARD COL. 11-20)                                              ISC06820
C          MODEL UNITS CONVERSION FACTOR USED TO PRODUCE THE DESIRED       ISC06830
C          OUTPUT CONCENTRATION (DEPOSITION) UNITS. THE DEFAULT FOR        ISC06840
C          CONCENTRATION IS 10**6 MICROGRAMS/GRAM ASSUMING OUTPUT IN       ISC06850
C          MICROGRAMS PER CUBIC METER AND SOURCE UNITS OF GRAMS/SEC. THE   ISC06860
C          DEFAULT FOR DEPOSITION IS 1.0 ASSUMING OUTPUT IN GRAMS PER      ISC06870
C          SQUARE METER AND SOURCES UNITS OF TOTAL GRAMS. IF THERE ARE     ISC06880
C          ANY VARIATIONS FROM THE ABOVE THEN TK MUST BE INPUT. ALSO, IF   ISC06890
C          TK IS DEFAULTED THEN THE PARAMETER UNITS ABOVE IS               ISC06900
C          AUTOMATICALLY FILLED AND CAN BE LEFT BLANK.                     ISC06910
C     ZR - (CARD COL. 21-30)                                              ISC06920
C          HEIGHT ABOVE GROUND AT AIRPORT OR WEATHER STATION AT WHICH      ISC06930
C          THE WIND SPEED WAS MEASURED (METERS) (DEFAULT =10.0)            ISC06940
C     G - (CARD COL. 31-40)                                               ISC06950
C         ACCELERATION OF GRAVITY (M/SEC**2) (DEFAULT = 9.8)              ISC06960
C     DECAY - (CARD COL. 41-50)                                           ISC06970
C             = THE WASHOUT COEFFICIENT (PER SEC) FOR PRECIPITATION       ISC06980
C             SCAVENGING.                                                 ISC06990
C                 OR                                                      ISC07000
C             = 0.693/T WHERE T IS THE POLLUTANT HALF LIFE FOR PHYSICAL   ISC07010
C             OR CHEMICAL REMOVAL(SEC).                                   ISC07020
C                 OR                                                      ISC07030
C             = 0 FOR NO DEPLETION.                                       ISC07040
C     NOTE THAT IF THE REG. DEFAULT OPTION IS CHOSEN AND SO2              ISC07050
C     IS MODELLED IN AN URBAN ENVIRONMENT A DECAY COEFFICIENT             ISC07060
C     OF .0000481 (=.693/3600 SEC) IS ASSIGNED                            ISC07070
C                                                                         ISC07080
C-CARD GROUP 14 (6F10.0 FORMAT) (NOT READ IF TAPE INPUT)                  ISC07090
C     UBAR - ARRAY CONTAINING THE MEDIAN VALUE OF EACH WIND SPEED         ISC07100
C            CATEGORY (M/SEC). IF ANY VALUE ON THIS CARD IS ZERO THE      ISC07110
C            PROGRAM WILL DEFAULT THE VALUE  1.5, 2.5  4.3, 6.8, 9 3,     ISC07120
C            12.5 M/SEC DEPENDING ON THE RELATIVE POSITION ON THE CARD.   ISC07130
C            (CARD COL. 1-10,11-20,---,51-60)                             ISC07140
C                                                                         ISC07150
C-CARD GROUP 15 (8F10.0 FORMAT) (NOT READ IF TAPE INPUT)                  ISC07160
C     THETAP - ARRAY OF WIND DIRECTION SECTOR CATEGORY ANGLES (DEGREES).  ISC07170
C     (PHI) IF THE FIRST TWO VALUES OF THIS ARRAY ARE ZERO THE PROGRAM    ISC07180
C           DEFAULTS TO THE SET OF VALUES 0.0,22.5,45.0,...,337.5 DEG.    ISC07190
C           (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                 ISC07200
C           (THIS VALUE IS THE DIRECTION FROM WHICH THE WIND IS COMING.   ISC07210
C           ALSO, THIS ARRAY IS REFERED TO AS PHI IN THE REMAINDER OF     ISC07220
C           THE PROGRAM)                                                  ISC07230
C                                                                         ISC07240
C-CARD GROUP 16 (6F10.0 FORMAT) (NOT READ IF TAPE INPUT)                  ISC07250
C     P - ARRAY OF WIND SPEED POWER LAW EXPONENTS. THERE ARE NSPEED       ISC07260
C         VALUES READ PER CARD AND NSTBLE CARDS READ.                     ISC07270
C     IF THE FIRST VALUE OF ANY CARD IS ZERO DEFAULT EXPONENTS            ISC07280
C     ARE USED.  FOR THE URBAN MODE : A .15, B .15, C .20,                ISC07290
C     D .25, E .30, F .30 .  FOR THE RURAL MODE : A .07,B .07             ISC07300
C     C .10, D .15, E .35, F .55   .                                      ISC07310
C                 ALSO, IF ANY OF THE SECOND THROUGH NSPEED VALUES ON ANY ISC07320
C         CARD ARE ZERO THE PROGRAM SETS IT EQUAL TO THE LAST NON-ZERO    ISC07330
C         VALUE ENCOUNTERED AS IT SCANS THE CARD FROM LEFT TO RIGHT.      ISC07340
C         IF A NEGATIVE VALUE IS INPUT, THE PROGRAM WILL SUBSTITUTE       ISC07350
C         ZERO IN THE CALCULATIONS.                                       ISC07360
C         IF THE REG. DEFAULT OPTION IS SELECTED(ISW(22)=0)               ISC07370
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C          ANY USER-INPUT VALUES WILL BE REPLACED WITH                          ISC07370
C          DEFAULT VALUES.                                                      ISC07380
C          (CARD COL. 1-10,11-20,---,51-60 OF EACH CARD)                        ISC07390
C                                                                               ISC07400
C      NOTE THAT IF CARD GROUPS 17 THROUGH 17D ARE TO BE INPUT THEN             ISC07410
C      INCLUDE CARD GROUPS 17 THROUGH 17D FOR SOURCE 1, FOLLOWED BY             ISC07420
C      GROUPS 17 THROUGH 17D FOR SOURCE 2, ETC.                                 ISC07430
C-CARD GROUP 17 (I5,3I1,2F10.0,7F7.0,I1,I2) INITIAL CARD FOR EACH               ISC07440
C          SOURCE INPUT VIA DATA CARDS. CARD GROUPS 17 THROUGH 17D ARE          ISC07450
C          ALL INPUT SOURCE RELATED.                                            ISC07460
C      NUMS - (CARD COL. 1-5)                                                   ISC07470
C             SOURCE IDENTIFICATION NUMBER. INPUT ALL SOURCES IN                ISC07480
C             ASCENDING ORDER OF THE IDENTIFICATION NUMBER.                     ISC07490
C             (DEFAULT = ORDER OF INPUT STARTING AT 1. DO NOT USE DEFAULT       ISC07500
C             IF TAPE INPUT) (NUMERIC ONLY).                                    ISC07510
C             IF A NEGATIVE VALUE IS INPUT IT INDICATES THE END OF THE          ISC07520
C             SOURCE INPUT DATA.                                                ISC07530
C      DISP - (CARD COL. 6) - SOURCE DISPOSITION.                               ISC07540
C           IF = 0 THE PROGRAM ASSUMES THIS IS A NEW SOURCE TO BE               ISC07550
C                  MERGED INTO THE OLD TAPE SOURCES IF PRESENT OR THIS          ISC07560
C                  SOURCE IS TO REPLACE THE OLD TAPE SOURCE HAVING THE          ISC07570
C                  SAME SOURCE IDENTIFICATION NUMBER.                           ISC07580
C           IF = 1 THE PROGRAM ASSUMES THE OLD TAPE SOURCE HAVING THE           ISC07590
C                  SAME SOURCE IDENTIFICATION NUMBER IS TO BE DELETED.          ISC07600
C                  THE REMAINING PARAMETERS ON THIS CARD ARE NOT USED           ISC07610
C                  NOR ARE CARDS 17A THROUGH 17D READ.                          ISC07620
C           IF = 2 THE PROGRAM ASSUMES THE SOURCE STRENGTHS FOR THIS            ISC07630
C                  SOURCE ARE USED TO RESCALE THE CONCENTRATION                  ISC07640
C                  (DEPOSITION) CALCULATIONS OF THE OLD TAPE SOURCE             ISC07650
C                  HAVING THE SAME SOURCE IDENTIFICATION NUMBER. THE            ISC07660
C                  REMAINING PARAMETERS ON THIS CARD ARE NOT USED AND           ISC07670
C                  THE PROGRAM READS ONLY CARD GROUP 17D. THIS OPTION           ISC07680
C                  CAN ONLY BE USED IF QFLG IN THE OLD SOURCE DATA              ISC07690
C                  IS ZERO FOR THIS SOURCE. THIS OPTION CAN BE USED             ISC07700
C                  TO CONVERT THE CONCENTRATION (DEP) CALCULATIONS              ISC07710
C                  FROM ONE POLLUTANT TYPE TO ANOTHER WITHOUT HAVING            ISC07720
C                  TO TOTALLY RECALCULATE.                                      ISC07730
C      TYPE - (CARD COL. 7)                                                     ISC07740
C           SOURCE TYPE WHERE IF 0 A STACK IS ASSUMED, IF = 1 A VOLUME          ISC07750
C           SOURCE IS ASSUMED OR IF = 2 AN AREA SOURCE IS ASSUMED.              ISC07760
C      QFLG - (CARD COL. 8)                                                     ISC07770
C           SPECIAL FLAG TO INDICATE HOW THE SOURCE STRENGTH VARIES.            ISC07780
C           IF = 0 THEN SOURCE STRENGTH VARIES WITH SEASON ONLY AND             ISC07790
C                  NSEASN VALUES ARE INPUT ON ONE DATA CARD UNDER               ISC07800
C                  CARD GROUP 17D BELOW.                                        ISC07810
C           IF = 1 THEN SOURCE STRENGTH VARIES WITH SEASON AND                  ISC07820
C                  STABILITY. THERE ARE NSTBLE VALUES READ PER CARD             ISC07830
C                  AND NSEASN CARDS READ UNDER CARD GROUP 17D BELOW.            ISC07840
C           IF = 2 THEN SOURCE STRENGTH VARIES WITH SPEED AND                   ISC07850
C                  SEASON. THERE ARE NSPEED VALUES READ PER CARD                ISC07860
C                  AND NSEASN CARDS READ UNDER CARD GROUP 17D BELOW.            ISC07870
C           IF = 3 THEN SOURCE STRENGTH VARIES WITH SEASON, STABILITY           ISC07880
C                  AND SPEED. THERE ARE NSPEED VALUES READ PER CARD             ISC07890
C                  AND NSTBLE CARDS READ FOR EACH SEASON 1 TO NSEASN            ISC07900
C                  UNDER CARD GROUP 17D BELOW.                                  ISC07910
C      DX - X COORDINATE OF THE SOURCE (METERS) (CARTESIAN COORDINATES          ISC07920
C           ONLY) (CARD COL. 9-18). IF THE SOURCE IS AN AREA SOURCE             ISC07930
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C           ENTER THE X COORDINATE OF THE SOUTH-WEST CORNER                ISC07940
C      DY - Y COORDINATE OF THE SOURCE (METERS) (CARTESIAN COORDINATES      ISC07950
C           ONLY) (CARD COL. 19-28). IF THE SOURCE IS AN AREA SOURCE       ISC07960
C           ENTER THE Y COORDINATE OF THE SOUTH-WEST CORNER                ISC07970
C      H - HEIGHT ABOVE GROUND OF THE EMISSION (METERS) (CARD COL. 29-35)  ISC07980
C          (IF THIS IS A VOLUME SOURCE H IS THE HEIGHT TO THE CENTER OF    ISC07990
C          THE SOURCE).                                                    ISC08000
C      ZS - ELEVATION OF GROUND AT SOURCE SITE (METERS) (CARD COL. 36-42)  ISC08010
C           (NOT USED IF ISW(4) = 0)                                       ISC08020
C     - TYPE 0 SOURCES -                                                   ISC08030
C      TS - STACK GAS EXIT TEMP. (DEG K). IF TS IS LESS THAN OR EQUAL TO   ISC08040
C           ZERO THE ABSOLUTE VALUE IS ADDED TO THE AMBIENT AIR TEMP. TO   ISC08050
C           FORM THE STACK GAS EXIT TEMP. (CARD COL. 43-49)                ISC08060
C      VEL - STACK GAS EXIT VELOCITY (M/SEC) (CARD COL. 50-56)             ISC08070
C      D - INTERNAL STACK DIAMETER (METERS) (CARD COL. 57-63)              ISC08080
C      HB - HEIGHT ABOVE GROUND (METERS) OF THE TALLEST BUILDING WITHIN    ISC08090
C           2*HB OF THE STACK.  IF THE REGULATORY MODE IS SELECTED         ISC08100
C           (ISW(22)='0') AND H IS LESS THAN OR EQUAL TO HB + ONE-HALF     ISC08110
C           THE LESSER OF HB OR BW, THE PROGRAM EXPECTS TO READ AND USE    ISC08120
C           UPTO 16 DIRECTION SPECIFIC BUILDING HEIGHTS AND WIDTHS         ISC08130
C           FROM CARDS 17CA AND 17CB OF THIS GROUP.  IF INPUT AS A         ISC08140
C           NEGATIVE VALUE AND THE HEIGHT CRITERIA ABOVE IS NOT MET,       ISC08150
C           THE PROGRAM READS PAST THE FOUR LINES. (CARD COL. 64-70)       ISC08160
C      BW - WIDTH (METERS) OF THE TALLEST BUILDING WITHIN 2*HB OF THE      ISC08170
C           STACK. IF THE BUILDING IS NOT SQUARE INPUT THE WIDTH OF A      ISC08180
C           SQUARE BUILDING OF EQUAL AREA. (CARD COL. 71-77)               ISC08190
C      WAKE - WAKE EFFECTS FLAG. IF THE EFFECTIVE BUILDING WIDTH TO        ISC08200
C             HEIGHT RATIO IS GREATER THAN 5 AND WAKE IS 0 OR BLANK       ISC08210
C             THE PROGRAM USES THE EQUATION OF LATERAL VIRTUAL DISTANCE    ISC08220
C             THAT WILL PRODUCE THE UPPER BOUND OF THE CONCENTRATION       ISC08230
C             (DEPOSITION) FOR THIS SOURCE. IF THE RATIO IS GREATER THAN   ISC08240
C             5 AND WAKE IS SET EQUAL TO 1 THE PROGRAM USES THE EQUATION   ISC08250
C             OF LATERAL VIRTUAL DISTANCE THAT WILL PRODUCE THE LOWER      ISC08260
C             BOUND OF THE CONCENTRATION (DEPOSITION) FOR THIS SOURCE.     ISC08270
C             (CARD COL. 78)                                               ISC08280
C     - TYPE 1 SOURCES -                                                   ISC08290
C      SIGYO - STANDARD DEVIATION OF THE CROSSWIND VOLUME SOURCE           ISC08300
C              DISTRIBUTION (METERS). (CARD COL. 43-49)                    ISC08310
C      SIGZO - STANDARD DEVIATION OF THE VERTICAL VOLUME SOURCE            ISC08320
C              DISTRIBUTION (METERS). (CARD COL. 50-56)                    ISC08330
C     - TYPE 2 SOURCES -                                                   ISC08340
C      XO - WIDTH OF THE AREA SOURCE (METERS) (CARD COL. 43-49)            ISC08350
C     - ALL SOURCE TYPES -                                                 ISC08360
C      NVS - NUMBER OF PARTICLE SIZE CATEGORIES FOR GRAVITATIONAL          ISC08370
C            DEPOSITION OR CONCENTRATION WITH DEPLETION DUE TO             ISC08380
C            GRAVITATIONAL DEPOSITION (MAX = 20).                          ISC08390
C            (CARD COL. 79-80)                                             ISC08400
C                                                                          ISC08410
C-CARD GROUP 17A (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS      ISC08420
C     ZERO.                                                                ISC08430
C     VS - ARRAY OF SETTLING VELOCITIES FOR THE PARTICLE SIZE CATORIES     ISC08440
C          (M/SEC) (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)           ISC08450
C                                                                          ISC08460
C-CARD GROUP 17B (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS      ISC08470
C     ZERO                                                                 ISC08480
C     FRQ - ARRAY OF MASS FRACTION OF PARTICULATES FOR THE PARTICLE SIZE   ISC08490
C           CATEGORIES (FRACTION).                                         ISC08500
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C          (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                    ISC08510
C                                                                           ISC08520
C-CARD GROUP 17C (8F10.0 FORMAT) (NOT READ IF NVS ON CARD GROUP 17 IS       ISC08530
C                                                                           ISC08540
C     ZERO                                                                  ISC08550
C     GAMMA - ARRAY OF SURFACE REFLECTION COEFFICIENTS FOR THE PARTICLE      ISC08560
C             SIZE CATEGORIES. A VALUE OF 0 IS NO REFLECTION UP TO 1 AS     ISC08570
C             COMPLETE REFLECTION. (FRACTION 0 TO 1)                        ISC08580
C             (CARD COL. 1-10,11-20,---,71-80 ON EACH CARD)                 ISC08590
C                                                                           ISC08600
C-CARD GROUP 17CA (8F10.0 FORMAT)  (THESE CARDS ARE READ ONLY IF THE        ISC08610
C          VALUE OF HB IS < 0 FOR A GIVEN SOURCE OR ISW(22) = "0".  IF      ISC08620
C          SO THIS CARD IS READ AFTER CARDS 17A-17C IF NVS > 0 OR AFTER     ISC08630
C          THE SOURCE CARD IF NVS = 0.)                                     ISC08640
C                                                                           ISC08650
C   DSBH - DIRECTION SPECIFIC BUILDING HEIGHTS.  THE MODEL EXPECTS TO       ISC08660
C          READ UP TO 16 VALUES DEPENDING ON THETAP OF CARD GROUP 15.       ISC08670
C          ASSUMING THE DEFAULT OF 16 SECTORS, THE FIRST SECTOR IS          ISC08680
C          CENTERED AT NORTH COVERING A THETAP DEGREE RANGE AND CON-        ISC08690
C          TINUES CLOCKWISE AT THETAP INCREMENTS TO NORTH-NORTHWEST.        ISC08700
C          FOR A NORTH SECTOR WIND, INPUT THE BUILDING HEIGHT FROM THE      ISC08710
C          APPROPRIATE SECTOR (I.E. EITHER A NORTH OR SOUTH SECTOR).        ISC08720
C          NEGATIVE VALUES OF DSBH ARE USED TO DENOTE THE LOWER BOUND       ISC08730
C          WAKE EFFECTS CALCULATIONS.  (SEE WAKE ABOVE)                     ISC08740
C                                                                           ISC08750
C-CARD GROUP 17CB (8F10.0 FORMAT)  (THESE CARDS ARE READ ONLY IF THE        ISC08760
C          VALUE OF HB IS < 0 FOR A GIVEN SOURCE OR ISW(22) = "0".  IF      ISC08770
C          SO, THIS CARD IS READ AFTER CARD 17CA.)                          ISC08780
C                                                                           ISC08790
C   DSBW - DIRECTION SPECIFIC BUILDING WIDTHS.  THE MODEL EXPECTS TO        ISC08800
C          READ UP TO 16 VALUES DEPENDING ON THETAP OF CARD GROUP 15.       ISC08810
C          ASSUMING THE DEFAULT OF 16 SECTORS, THE FIRST SECTOR IS          ISC08820
C          CENTERED AT NORTH COVERING A THETAP DEGREE RANGE AND CON-        ISC08830
C          TINUES CLOCKWISE AT THETAP INCREMENTS TO NORTH-NORTHWEST.        ISC08840
C          FOR A NORTH SECTOR WIND, INPUT THE BUILDING HEIGHT FROM THE      ISC08850
C          APPROPRIATE SECTOR (I.E. EITHER A NORTH OR SOUTH SECTOR).        ISC08860
C                                                                           ISC08870
C-CARD GROUP 17D (6F10.0 FORMAT)                                            ISC08880
C     Q - (CARD COL. 1-10,11-20,---,51-60 OR AS MANY AS ARE READ PER        ISC08890
C         DATA CARD)                                                        ISC08900
C         ARRAY OF SOURCE EMISSION STRENGTHS. SEE QFLG ABOVE FOR THE        ISC08910
C         INPUT ORDER. NO DEFAULT VALUES OR LOGIC IS PROVIDED FOR           ISC08920
C         SOURCE STRENGTHS BECAUSE ZERO IS A VALID SOURCE STRENGTH.         ISC08930
C               THE UNITS OF Q ARE...                                       ISC08940
C           SOURCE TYPE              - CALCULATING -                        ISC08950
C                                CONCENTRATION          DEPOSITION         ISC08960
C         STACK OR VOLUME        MASS PER UNIT TIME      TOTAL MASS        ISC08970
C             AREA               MASS PER UNIT TIME PER  TOTAL MASS PER     ISC08980
C                                     UNIT AREA             UNIT AREA       ISC08990
C         IF TK ABOVE IS DEFAULTED THEN THE PROGRAMS Q IS IN GRAMS/SEC      ISC09000
C         FOR CONCENTRATION AND GRAMS FOR TOTAL DEPOSITION.                 ISC09010
C                                                                           ISC09020
C *** REPEAT CARD GROUPS 17 TO 17D FOR EACH SOURCE INPUT                    ISC09030
C                                                                           ISC09040
C################## END OF INPUT DATA ######################################ISC09050
      WRITE (6,1234)                                                        ISC09060
 1234 FORMAT ('1',21X,'ISCLT (DATED 87338) '/                               ISC09070
     1 22X,'AN AIR QUALITY DISPERSION MODEL IN'/
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     2 22X,'SECTION 1.  GUIDELINE MODELS'/                                  ISC09080
     3 22X,'IN UNAMAP (VERSION 6) JULY 86.'/                                ISC09090
     4 22X,'SOURCE:  UNAMAP FILE ON EPA''S UNIVAC AT RTP, NC.  ')           ISC09100
C                                                                           ISC09110
C     CARD READER IS IUNT, PRINTER IS JUNT                                  ISC09120
      IUNT = 5                                                              ISC09130
      JUNT = 6                                                              ISC09140
C     INPUT TAPE IS UNIT MUNT, OUTPUT IS NUNT                               ISC09150
      MUNT = 2                                                              ISC09160
      NUNT = 3                                                              ISC09170
C     IEND IS TOTAL AMOUNT OF STORAGE IN ARRAY CORE                         ISC09180
      IEND = 40000                                                          ISC09190
C     READ RUN TITLE                                                        ISC09200
C***  CARD GROUP 1                                                          ISC09210
      READ (IUNT,9001) TITLE                                                ISC09220
C     READ PROGRAM OPTIONS                                                  ISC09230
C***  CARD GROUP 2                                                          ISC09240
      READ (IUNT,9006) JSW                                                  ISC09250
      IF(JSW(24).EQ.0) THEN                                                 ISC09260
      WRITE(JUNT,9506) JSW                                                  ISC09270
      ENDIF                                                                 ISC09280
      IF (JSW(14) .NE. 0) MUNT = IABS(JSW(14))                              ISC09290
      IF (JSW(15) .NE. 0) NUNT = IABS(JSW(15))                              ISC09300
   10 IF (JSW(5) .LE. 1) GO TO 70                                           ISC09310
      READ (MUNIT,END=10) (MSOR(I),I=1,72)                                  ISC09320
      DO 20 I=2,52                                                          ISC09330
   20 NSOR(I) = MSOR(I)                                                     ISC09340
      J1 = ISW(9)                                                           ISC09350
      DO 30 I=5,24                                                          ISC09360
   30 ISW(I) = JSW(I)                                                       ISC09370
C     SET REGULATORY OPTION FOR TAPE INPUT                                  ISC09380
      IF(ISW(22).NE.0) GO TO 35                                             ISC09390
      ISW(19)=0                                                             ISC09400
      ISW(20)=1                                                             ISC09410
      ISW(21)=0                                                             ISC09420
   35 CONTINUE                                                              ISC09430
      IF (ISW(9) .EQ. 0) ISW(9) = J1                                        ISC09440
      IF (ISW(11) .GT. 0.AND.ISW(10) .EQ. 0) ISW(10) = 1                    ISC09450
      IF (ISW(12) .GT. 0.AND.ISW(10) .EQ. 0) ISW(10) = 1                    ISC09460
      DO 40 I=1,10                                                          ISC09470
      IF (TITLE(I) .NE. J5) GO TO 60                                        ISC09480
   40 CONTINUE                                                              ISC09490
      DO 50 I=53,72                                                         ISC09500
   50 NSOR(I) = MSOR(I)                                                     ISC09510
   60 CONTINUE                                                              ISC09520
C     READ NO. OF CARD INPUT SOURCES WITH TAPE INPUT                        ISC09530
C***  CARD GROUP 3 (WITH TAPE INPUT)                                        ISC09540
      READ (IUNT,9004) NSOURC,NGROUP,NXWY,NOFILE                            ISC09550
      IF(ISW(24).EQ.0) THEN                                                 ISC09560
      WRITE(JUNT,9504) NSOURC,NGROUP,NXWY,NOFILE                            ISC09570
      ENDIF                                                                 ISC09580
      GO TO 90                                                              ISC09590
   70 CONTINUE                                                              ISC09600
      DO 80  I=1,25                                                         ISC09610
   80 ISW(I) = JSW(I)                                                       ISC09620
C     SET REGULATORY OPTION                                                 ISC09630
      IF(ISW(22).NE.0) GO TO 85                                             ISC09640
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      ISW(19)=0                                                          ISC09650
      ISW(20)=1                                                          ISC09660
      ISW(21)=0                                                          ISC09670
   85 CONTINUE                                                           ISC09680
C     READ DATA SIZE PARAMETERS - NO TAPE INPUT                         ISC09690
C***  CARD GROUP 3 (NO TAPE INPUT)                                      ISC09700
      READ (IUNT,9002) NSOURC,NGROUP,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,ISC09710
     1NSTBLE,NSCTOR,NOFILE                                              ISC09720
      IF(ISW(24).EQ.0) THEN                                             ISC09730
      WRITE(JUNT,9502) NSOURC,NGROUP,NXPNTS,NYPNTS,NXWYPT,NSEASN,       ISC09740
     1  NSPEED,NSTBLE,NSCTOR,NOFILE                                      ISC09750
      ENDIF                                                             ISC09760
   90 CONTINUE                                                          ISC09770
      IF (NOFILE .LE. 0) NOFILE = 1                                     ISC09780
      LINE = 0                                                          ISC09790
      IF (ISW(13) .LT. 0) LINE = 1                                      ISC09800
      ISW(13) = IABS(ISW(13))                                           ISC09810
C     DEFAULT SIZE PARAMETERS                                           ISC09820
      IF (NSEASN .LE. 0) NSEASN = 1                                     ISC09830
      IF (NSPEED .LE. 0) NSPEED = 6                                     ISC09840
      IF (NSCTOR .LE. 0) NSCTOR = 16                                    ISC09850
      DO 100  I=1,6                                                     ISC09860
  100 ISTBLE(I) = I                                                     ISC09870
      IF (ISW(9) .EQ. 0) ISW(9) = 3                                     ISC09880
      IF(ISW(9) .EQ. 3 .OR. ISW(9) .EQ. 4) GOTO 120                     ISC09890
      IF (ISW(9) .EQ. 2) GO TO 110                                      ISC09900
C     URBAN MODE 1                                                      ISC09910
      ISTBLE(5) = 4                                                     ISC09920
      ISTBLE(6) = 4                                                     ISC09930
      GO TO 130                                                         ISC09940
  110 CONTINUE                                                          ISC09950
C     URBAN MODE 2                                                      ISC09960
      ISTBLE(2) = 1                                                     ISC09970
      ISTBLE(3) = 2                                                     ISC09980
      ISTBLE(4) = 3                                                     ISC09990
      ISTBLE(5) = 4                                                     ISC10000
      ISTBLE(6) = 4                                                     ISC10010
      GO TO 130                                                         ISC10020
C     RURAL MODE 1 AND URBAN MODE 3                                     ISC10030
  120 CONTINUE                                                          ISC10040
  130 IF (NSTBLE .LE. 0) NSTBLE = 6                                     ISC10050
C***  CARD GROUP 4                                                      ISC10060
      IF (NGROUP .LE. 0) GO TO 150                                      ISC10070
      READ (IUNT,9002) (NOCOMB(I),I=1,NGROUP)                           ISC10080
      IF(ISW(24).EQ.0) THEN                                             ISC10090
      WRITE(JUNT,9502) (NOCOMB(I),I=1,NGROUP)                           ISC10100
      ENDIF                                                             ISC10110
      J = 0                                                             ISC10120
      DO 140 I=1,NGROUP                                                 ISC10130
  140 J = J+NOCOMB(I)                                                   ISC10140
      READ (IUNT,9005) (IDSORC(I),I=1,J)                                ISC10150
      IF(ISW(24).EQ.0) THEN                                             ISC10160
      WRITE(JUNT,9505) (IDSORC(I),I=1,J)                                ISC10170
      ENDIF                                                             ISC10180
  150 CONTINUE                                                          ISC10190
      IF (ISW(5) .GE. 2) GO TO 160                                      ISC10200
C     READ CONCENTRATION (DEPOSITION) OUTPUT UNITS AND SOURCE STRENGTH  ISC10210
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C     INPUT UNITS                                                          ISC10220
C***  CARD GROUP 5 (NOT READ IF TAPE INPUT)                                ISC10230
      READ (IUNT,9001) UNITS                                               ISC10240
      IF(ISW(24).EQ.0) THEN                                                ISC10250
      WRITE(JUNT,9501) UNITS                                               ISC10260
      ENDIF                                                                ISC10270
  160 CONTINUE                                                             ISC10280
C     REG. DEFAULT OPTION SWITCHES                                         ISC10290
      IF (ISW(7) .LE. 0) ISW(7) = 3                                        ISC10300
      IF (ISW(8) .LE. 0) ISW(8) = 3                                        ISC10310
      DO 170 I=1,3                                                         ISC10320
      IF (ISW(I) .LE. 0) ISW(I) = 1                                        ISC10330
  170 CONTINUE                                                             ISC10340
      IF (ISW(13) .GT. 0) JUNT = ISW(13)                                   ISC10350
      NLINES = 57                                                          ISC10360
      IF (ISW(17) .GT. 0) NLINES = ISW(17)                                 ISC10370
      LINE = 100                                                           ISC10380
C     CALCULATE STARTING LOCATION OF EACH ARRAY IN BLANK COMMON            ISC10390
C                                                                          ISC10400
C     STARTING LOCATION OF X AXIS INCLUDING ANY SPECIAL CALCULATION        ISC10410
C     RECEPTOR POINTS                                                      ISC10420
      J1 = 1                                                               ISC10430
C     STARTING LOCATION OF Y AXIS INCLUDING ANY SPECIAL CALCULATION        ISC10440
C     RECEPTOR POINTS                                                      ISC10450
      J2 = J1+NXPNTS+NXWYPT                                                ISC10460
C     STARTING LOCATION OF Z ELEVATION POINTS AND RHT RECEPTOR HEIGHTS     ISC10470
C     ABOVE GROUND FOR GRID AND SPECIAL POINTS                             ISC10480
      J3 = J2+NYPNTS+NXWYPT                                                ISC10490
      NXXYY = NXPNTS*NYPNTS                                                ISC10500
      NXXYYP = NXXYY+NXWYPT                                                ISC10510
      J4 = J3                                                              ISC10520
      IF (ISW(4) .NE. 0) J4 = J3+NXXYYP                                    ISC10530
C     STARTING LOCATION OF THE CONCENTRATION (DEPOSITION) ARRAYS           ISC10540
      J5 = J4                                                              ISC10550
      IF (ISW(25) .NE. 0) J5 = J4+NXXYYP                                   ISC10560
      J6 = J5+NSEASN*NXXYYP-1                                              ISC10570
      IF (ISW(8) .NE. 1.OR.ISW(11) .EQ. 2) J6 = J6+NSEASN*NXXYYP           ISC10580
C     DETERMINE IF ENOUGH STORAGE                                          ISC10590
      IF (J5 .LE. IEND) GO TO 180                                          ISC10600
      WRITE (JUNT,9003) IEND,J5                                            ISC10610
      IF (J6 .LE. IEND) GO TO 180                                          ISC10620
      WRITE (JUNT,9003) IEND,J6                                            ISC10630
      GO TO 190                                                            ISC10640
  180 CONTINUE                                                             ISC10650
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) WRITE (NUNT) (NSOR(I),I=1,72)    ISC10660
C     EXECUTE LONG TERM MODEL                                              ISC10670
      CALL MODEL(CORE(J1),CORE(J2),CORE(J3),CORE(J4),CORE(J5))             ISC10680
  190 STOP                                                                 ISC10690
 9001 FORMAT (20A4)                                                        ISC10700
 9002 FORMAT (20I4)                                                        ISC10710
 9003 FORMAT (////22H ERROR - MAX STORAGE =,I6,17H, USER REQUESTED ,I6,2ISC10720
     18H, REDUCE NO. OF CALC. POINTS///)                                   ISC10730
 9004 FORMAT (2I4,8X,I4,16X,I4)                                            ISC10740
 9005 FORMAT (13I6)                                                        ISC10750
 9006 FORMAT (25I2)                                                        ISC10760
 9501 FORMAT(1X,20A4)                                                      ISC10770
 9502 FORMAT(1X,20I4)                                                      ISC10780
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 9504 FORMAT(1X,2I4,8X,I4,16X,I4)                                        ISC10790
 9505 FORMAT(1X,13I6)                                                    ISC10800
 9506 FORMAT(1X,25I2)                                                    ISC10810
      END                                                                ISC10820
C                                                                       ISC10830
      SUBROUTINE MODEL(X,Y,Z,RHT,CON)                                   ISC10840
C               SUBROUTINE MODEL (VERSION 87338), PART OF ISCLT.        ISC10850
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,    ISC10860
     1NSCTOR,ISW(25),UNITS(20),TITLE(20),NOFILE                         ISC10870
      COMMON /MET/ FREQ(6,16,24),TA(6,4),HM(6,6,4),DPDZ(6,6),UBAR(6),   ISC10880
     1P(6,6),PHI(16),ROTATE,G,ZR,DECAY,TK                               ISC10890
C     NORMALLY THE ARRAY FREQ IN COMMON /MET/ WOULD BE DIMENSIONED 6,6, ISC10900
C     6,4. HOWEVER, SOME FORTRAN COMPILERS LIMIT THE MAXIMUM NUMBER OF  ISC10910
C     DIMENSIONS TO 3, SO THERE ARE ACTUALLY 2 DIMENSIONS IN THE THIRD  ISC10920
C     SET TO 24.                                                        ISC10930
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC10940
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC10950
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC10960
C     ADD DIRECTION SPECIFIC SWITCH FOR WAKE TREATMENT BOUNDS           ISC10970
     300),IEMD,XSEA,ISAVSO(300),NG,NGT,NXWY,IWAKSW(16)                  ISC10980
      COMMON /DIST/ XB,YB,XYP,TMN,TR,TRI,ARG,RP,RPI                     ISC10990
      COMMON /VERT/ SIGZI,SIGZ,HMP,HP,V,VSROU,BBAR                      ISC11000
C     DATA CARD SOURCE INPUT DATA                                       ISC11010
      COMMON /SORC1/ NUMS1,TYPE1,DX1,DY1,H1,ZS1,TS1,VEL1,D1,HB1,BW1,BL1,ISC11020
     1NVS1,VS1(20),FRQ1(20),GAMMA1(20),DSBH1(16),DSBW1(16),Q1(6,6,4),   ISC11030
     2QFLG1,WAKE1,DISP                                                  ISC11040
C     TAPE SOURCE INPUT DATA                                            ISC11050
      COMMON /SORC2/ NUMS2,TYPE2,DX2,DY2,H2,ZS2,TS2,VEL2,D2,HB2,BW2,BL2,ISC11060
     1NVS2,VS2(20),FRQ2(20),GAMMA2(20),DSBH2(16),DSBW2(16),Q2(6,6,4),   ISC11070
     2QFLG2,WAKE2                                                       ISC11080
C     SOURCE FOR WHICH CONCENTRATION (DEPOSITION) IS CURRENTLY BEING    ISC11090
C     CALCULATED.                                                       ISC11100
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),FRISC11110
     1Q(20),GAMMA(20),DSBH(16),DSBW(16),Q(6,6,4),QFLG,WAKE              ISC11120
C     ARRAYS FOR STORAGE OF CONSTANTS USED TO CALCULATE SIGY, SIGZ, XY, ISC11130
C     XZ                                                                ISC11140
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC11150
     18),IA(7),JA(6),DST(33),IDP                                        ISC11160
      DIMENSION X(1),Y(1),Z(1),RHT(1),CON(1),NSOR1(1),NSOR2(1),NSOR(1), ISC11170
C     DELH IS NOW FOUR DIMENSIONS TO INCORPORATE DIRECTION SPECIFIC     ISC11180
C     BUILDING DIMENSION DATA                                           ISC11190
C     ADD VARIABLES FOR DIRECTION SPECIFIC BUILDING DIMENSIONS          ISC11200
     1MSG1(3,4),UBRS(6),UNIT(20),UNIS(20),STBLE(2),DELH(6,6,16,16),     ISC11210
     2XY(6,16),FFQ(1),UBHI(6,6),PHS(16),PHC(16),MSG2(6,2),DSHP(16),     ISC11220
     3DSHW(16),DSHB2(16),DSHB12(16),DSHMIN(16),FMT(20),HBRIG(6,6)       ISC11230
       DIMENSION PPR(6),PPU(6)                                          ISC11240
C     THE FIRST DIMENSION OF THE ARRAY CON ABOVE CONTAINS NYPNTS*NYPNTS+ISC11250
C     NXWYPT POINTS. THE VARIABLE IS SET UP THIS WAY TO ACCOMMODATE ANY ISC11260
C     COMBINATION OF GRID SYSTEM POINTS AND SPECIAL DISCRETE POINTS.    ISC11270
      EQUIVALENCE (NSOR1(1),NUMS1),(NSOR2(1),NUMS2),(NSOR(1),NUMS)      ISC11280
     1,(FFQ(1),FREQ(1,1,1)),(SIGYO,TS),(SIGZO,VEL),(TS1,XOP)            ISC11290
     2,(SIGYO1,TS1),(FMT(1),GAMMA(1))                                   ISC11300
      INTEGER TYPE1,TYPE2,TYPE,TITLE,UNITS,DISP,QFLG,UNIT,UNIS          ISC11310
     1,QFLG1,QFLG2,QFLGS,WAKE,FMT,WAKE1,WAKE2                           ISC11320
C     DIMENSION SWITCHES FOR DIRECTION SPECIFIC BUILDING DIMENSIONS     ISC11330
      INTEGER DSNSW1(16),DSNSW2(16),DSJTYP(16),DSROCK(16),DSUBCK(16)    ISC11340
      DATA MSG1/4HURBA,4HN MO,4HDE 1,4HURBA,4HN MO,4HDE 2,4HRURA,4HL MO,ISC11350
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     14HDE  ,4HURBA,4HN MO,4HDE 3/                                                  ISC11360
                                                                                    ISC11370
C     DEFAULT WIND SPEEDS                                                          ISC11380
      DATA UBRS/ 1.5,2.5,4.3,6.8,9.5,12.5/                                         ISC11390
C     DEFAULT UNITS                                                                ISC11400
      DATA UNIT/4H MIC,4HROGR,4HAMS ,4HPER ,4HCUBI,4HC ME,4HTER ,3*1H ,            ISC11410
     14H GRA,4HMS P,4HER S,4HEC  ,6*1H /                                           ISC11420
      DATA UNIS/4H GRA,4HMS P,4HER S,4HQUAR,4HE ME,4HTER ,4*1H ,                   ISC11430
     14H GRA,4HMS  ,C*1H /                                                         ISC11440
C     DEFAULT VERTICAL POTENTIAL TEMPERATURE GRADIENTS                             ISC11450
      DATA STBLE/0.02,0.035/                                                       ISC11460
C     DEFAULT WIND PROFILE POWER LAW EXPONENTS (URBAN OR RURAL)                    ISC11470
      DATA PPR/.07,.07,.10,.15,.35,.55/                                            ISC11480
      DATA PPU/.15,.15,.20,.25,.30,.30/                                            ISC11490
      DATA MSG7/1H ,4H   D,4HISTA,3HNCE,2*1H ,4H  RA,3HNGE,4HAZIM,4HUTH            ISC11500
     1,4HBEAR,3HING/                                                               ISC11510
      DATA MSG8/1HX,1HY/                                                           ISC11520
      DATA MSG9/4HMETE,2HRS,4HDEGR,3HEES/                                          ISC11530
      DATA MSG2/4H AXI,4HS GR,4HID S,4HYSTE,4HM PO,4HINTS,4H SPE,4HCIAL,           ISC11540
     14H DIS,4HCRET,4HE PO,4HINTS/                                                 ISC11550
      DATA RADIAN/.01745329/                                                       ISC11560
      DATA AS/ 122.8,                                                              ISC11570
     1        158.08,170.22,179.52,217.41,258.89,346.75,453.85,5000.0,             ISC11580
     190.673,98.483,109.3,61.141,34.459,32.093,32.093,33.504,36.65,44.05          ISC11590
     2 3,24.26,                                                                    ISC11600
     2  23.331,21.628,21.628,22.534,24.703,26.97,35.42,47.618,15.209,14.          ISC11610
     3457,13.953,13.953,14.823,16.187,17.836,22.651,27.074,34.219/                 ISC11620
      DATA BS/ .9447,                                                              ISC11630
     1        1.0542,1.0932,1.1262,1.2644,1.4094,1.7283,2.1166,0.0,.9319          ISC11640
     19,.98332,1.0971,.91465,.86974,.81066,.64403,.60486,.56589,.51179,           ISC11650
     2 .8366,                                                                      ISC11660
     2.81956,.7566,.63077,.57154,.50527,.46713,.37615,.29592,.81558,               ISC11670
     3.78407,.68465,.63227,.54503,.4649,.41507,.32681,.27436,.21716               ISC11680
      DATA PS/209.14,154.46,103.26,68.26,51.06,33.92/                              ISC11690
      DATA QS/.89,.902,.917,.919,.921,.919/                                        ISC11700
      DATA CS/24.167,18.333,12.5,8.333,6.25,4.1667/                                ISC11710
      DATA DS/2.5334,1.8096,1.0857,.72382,.54287,.36191/                           ISC11720
      DATA IA/1,9,11,12,17,25,34/                                                  ISC11730
      DATA JA/1,10,13,14,20,29/                                                    ISC11740
      DATA DST/ 0.10,                                                              ISC11750
     1         0.15,0.2,0.25,0.3,0.4,0.5,3.11,0.2,0.4,0.1,0.3,1.0,3.0,10         ISC11760
     1 .0,30.0,      .10,                                                         ISC11770
     1        0.3,1.0,2.0,4.0,10.0,20.0,40.0,0.2,0.7,1.0,2.0,3.0,7.0,15,        ISC11780
     120,30.0,60.0/                                                               ISC11790
      DATA ICONT/1H-,2*1H ,4H(CON,3HT.),1H-/,NT1/1/,NT2/1/,NT3/1/                  ISC11800
      CATA FMT/3H(6F,4H10.0,1H),17*1H /                                            ISC11810
      NUMSL = 0                                                                    ISC11820
      INDFL = LINE                                                                 ISC11830
      DO 10 I=1,6                                                                  ISC11840
      PS(I) = 1.0/PS(I)                                                            ISC11850
     10 QS(I) = 1.0/QS(I)                                                          ISC11860
      DO 20 I=1,38                                                                 ISC11870
      ASI(I) = 1.0/AS(I)                                                           ISC11880
      IF (BS(I) .GT. 0.0) BSI(I) = 1.0/BS(I)                                       ISC11890
     20 CONTINUE                                                                   ISC11900
C     TOTAL X POINTS                                                               ISC11910
      NXPS = NXPNTS+NXWYPT                                                         ISC11920
C     TOTAL Y POINTS
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      NYPS = NYPNTS+NXWYPT                                              ISC11930
C     NMET IS THE LENGTH OF COMMON /MET/                                ISC11940
      NMET=2571                                                         ISC11950
C     NSO IS THE LENGTH OF COMMON /SORC/                                ISC11960
      NSO = 251                                                         ISC11970
C     COUNTERS FOR WARNING MESSAGES                                     ISC11980
      IPR1 = 0                                                          ISC11990
C                                                                       ISC12000
      NT4 = 1                                                           ISC12010
C     INPUT CALCULATION POINTS AND MET DATA                             ISC12020
C*****************************************************************************ISC12030
      IF (ISW(5) .GE. 2) GO TO 210                                      ISC12040
C     INPUT X FOR GRID RECEPTORS.                                       ISC12050
      IF (NXPNTS .LE. 0) GO TO 60                                       ISC12060
C***  CARD GROUP 6 (NOT READ IF TAPE INPUT)                             ISC12070
      X(3) = 0.0                                                        ISC12080
      X(4) = 0.0                                                        ISC12090
      J = 8                                                             ISC12100
      IF (J .GT. NXPNTS) J = NXPNTS                                     ISC12110
      READ (IUNT,9002) (X(I),I=1,J)                                     ISC12120
      IF(ISW(24).EQ.0) THEN                                             ISC12130
      WRITE(JUNT,9502) (X(I),I=1,J)                                     ISC12140
      ENDIF                                                             ISC12150
      IF (ABS(X(3))+ABS(X(4))) 50,30,50                                 ISC12160
   30 IF (NXPNTS .LT. 3) GO TO 60                                       ISC12170
      A1 = X(2)                                                         ISC12180
      DO 40  I=2,NXPNTS                                                 ISC12190
   40 X(I) = X(I-1)+A1                                                  ISC12200
      GO TO 60                                                          ISC12210
   50 IF (NXPNTS .LE. 8) GO TO 60                                       ISC12220
C***  CARD GROUP 6 (CONTINUED)                                          ISC12230
      READ (IUNT,9002) (X(I),I=9,NXPNTS)                                ISC12240
      IF(ISW(24).EQ.0) THEN                                             ISC12250
      WRITE(JUNT,9502) (X(I),I=9,NXPNTS)                                ISC12260
      ENDIF                                                             ISC12270
   60 CONTINUE                                                          ISC12280
C      INPUT Y FOR GRID RECEPTORS                                       ISC12290
      IF (NYPNTS .LE. 0) GO TO 110                                      ISC12300
C***  CARD GROUP 7 (NOT READ IF TAPE INPUT)                             ISC12310
      Y(3) = 0.0                                                        ISC12320
      Y(4) = 0.0                                                        ISC12330
      J = 8                                                             ISC12340
      IF (J .GT. NYPNTS) J = NYPNTS                                     ISC12350
      READ (IUNT,9002) (Y(I),I=1,J)                                     ISC12360
      IF(ISW(24).EQ.0) THEN                                             ISC12370
      WRITE(JUNT,9502) (Y(I),I=1,J)                                     ISC12380
      ENDIF                                                             ISC12390
      IF (ABS(Y(3))+ABS(Y(4))) 100,80,100                               ISC12400
   80 IF (NYPNTS .LT. 3) GO TO 110                                      ISC12410
      A1 = Y(2)                                                         ISC12420
      DO 90  I=2,NYPNTS                                                 ISC12430
   90 Y(I) = Y(I-1)+A1                                                  ISC12440
      GO TO 110                                                         ISC12450
  100 IF (NYPNTS .LE. 8) GO TO 110                                      ISC12460
C***  CARD GROUP 7 (CONTINUED)                                          ISC12470
      READ (IUNT,9002) (Y(I),I=9,NYPNTS)                                ISC12480
      IF(ISW(24).EQ.0) THEN                                             ISC12490
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      WRITE(JUNT,9502) (Y(I),I=9,NYPNTS)                                ISC12500
      ENDIF                                                             ISC12510
  110 CONTINUE                                                          ISC12520
C     INPUT ELEVATIONS FOR GRID RECEPTORS                               ISC12530
      IF (ISW(4) .EQ. 0) GO TO 132                                      ISC12540
      IF (NXXYY .LE. 0) GO TO 140                                       ISC12550
      DO 130 J=1,NYPNTS                                                 ISC12560
      K = (J-1)*NXPNTS                                                  ISC12570
C***  CARD GROUP 8 (NOT READ IF TAPE INPUT)                             ISC12580
      READ (IUNT,9002) (Z(I+K),I=1,NXPNTS)                              ISC12590
      IF(ISW(24).EQ.0) THEN                                             ISC12600
      WRITE(JUNT,9502) (Z(I+K),I=1,NXPNTS)                              ISC12610
      ENDIF                                                             ISC12620
  130 CONTINUE                                                          ISC12630
C     INPUT HEIGHTS FOR FLAGPOLE GRID RECEPTORS                         ISC12640
  132 IF (ISW(25) .EQ. 0) GO TO 140                                     ISC12650
      DO 135 J=1,NYPNTS                                                 ISC12660
      L = (J-1)*NXPNTS                                                  ISC12670
C***  CARD GROUP 8-2 (NOT READ IF TAPE INPUT)                           ISC12680
      READ (IUNT,9002) (RHT(I+L),I=1,NXPNTS)                            ISC12690
      IF (ISW(24) .EQ. 0) THEN                                          ISC12700
      WRITE(JUNT,9502) (RHT(I+L),I=1,NXPNTS)                            ISC12710
      ENDIF                                                             ISC12720
  135 CONTINUE                                                          ISC12730
C     READ CARD GROUPS 6A,7A,8A, AND 8B                                 ISC12740
C     INPUT X,Y,Z, AND RHT FOR EACH DISCRETE RECEPTOR.                  ISC12750
C     READ 1 CARD FOR EACH DISCRETE RECEPTOR.                           ISC12760
  140 IF(NXWYPT.LE 0.) GO TO 150                                        ISC12770
      DO 145 I=1,NXWYPT                                                 ISC12780
      IF (ISW(4) .NE. 0 .AND. ISW(25) .NE. 0) THEN                      ISC12790
      READ(IUNT,9002) X(I+NXPNTS),Y(I+NYPNTS),Z(I+NXXYY),RHT(I+NXXYY)   ISC12800
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) X(I+NXPNTS),Y(I+NYPNTS),        ISC12810
     1Z(I+NXXYY),RHT(I+NXXYY)                                           ISC12820
      ELSEIF (ISW(4) .NE. 0) THEN                                       ISC12830
      READ(IUNT,9002) X(I+NXPNTS),Y(I+NYPNTS),Z(I+NXXYY),DUM            ISC12840
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) X(I+NXPNTS),Y(I+NYPNTS),        ISC12850
     1Z(I+NXXYY)                                                        ISC12860
      ELSEIF (ISW(25) .NE. 0) THEN                                      ISC12870
      READ(IUNT,9002) X(I+NXPNTS),Y(I+NYPNTS),DUM,RHT(I+NXXYY)          ISC12880
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) X(I+NXPNTS),Y(I+NYPNTS),        ISC12890
     1RHT(I+NXXYY)                                                      ISC12900
      ELSE                                                              ISC12910
      IF (ISW(4) .EQ. 0 .AND. ISW(25) .EQ. 0)                           ISC12920
     1READ(IUNT,9002) X(I+NXPNTS),Y(I+NYPNTS)                           ISC12930
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) X(I+NXPNTS),Y(I+NYPNTS)         ISC12940
      ENDIF                                                             ISC12950
  145 CONTINUE                                                          ISC12960
C     CHANGE RECEPTOR ELEVATION UNITS FROM FT TO METERS.                ISC12970
  150 IF(ISW(4).LE.0) GO TO 155                                         ISC12980
      DO 151 I=1,NXXYYP                                                 ISC12990
  151 Z(I)=Z(I)*.3048006                                                ISC13000
  155 ISW(4)=IABS(ISW(4))                                               ISC13010
C     READ FREQUENCY OF OCCURRENCE OF WIND SPEED VERSUS DIRECTION       ISC13020
C***  CARD GROUP 9 (NOT READ IF TAPE INPUT OR ISW(18)=0)                ISC13030
      IF (ISW(18) .NE. 0) READ (IUNT,9001) (FMT(I),I=1,20)              ISC13040
      IF(ISW(18).NE.0.AND.ISW(24).EQ.0) THEN                            ISC13050
      WRITE(JUNT,9501) (FMT(I),I=1,20)                                  ISC13060
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      ENDIF                                                              ISC13070
      DO 160 L=1,NSEASN                                                  ISC13080
      DO 160 K=1,NSTBLE                                                  ISC13090
      M = 4*(K-1)+L                                                      ISC13100
      DO 160 J=1,NSCTOR                                                  ISC13110
C***  CARD GROUP 9A (NOT READ IF TAPE INPUT)                             ISC13120
      READ (IUNT,FMT) (FREQ(I,J,M),I=1,NSPEED)                           ISC13130
      IF(ISW(24).EQ.0) THEN                                              ISC13140
      WRITE(JUNT,9599) (FREQ(I,J,M),I=1,NSPEED)                          ISC13150
      ENDIF                                                              ISC13160
  160 CONTINUE                                                           ISC13170
C                                                                        ISC13180
C     READ AMBIENT AIR TEMP IN DEGREES KELVIN                            ISC13190
      DO 170 J=1,NSEASN                                                  ISC13200
C***  CARD GROUP 10 (NOT READ IF TAPE INPUT)                             ISC13210
      READ (IUNT,9002) (TA(I,J),I=1,NSTBLE)                              ISC13220
      IF(ISW(24).EQ.0) THEN                                              ISC13230
      WRITE(JUNT,9502) (TA(I,J),I=1,NSTBLE)                              ISC13240
      ENDIF                                                              ISC13250
  170 CONTINUE                                                           ISC13260
C                                                                        ISC13270
C     READ MIXING LAYER HEIGHTS IN METERS                                ISC13280
      DO 180 K=1,NSEASN                                                  ISC13290
      DO 180 J=1,NSTBLE                                                  ISC13300
C***  CARD GROUP 11 (NOT READ IF TAPE INPUT)                             ISC13310
      READ (IUNT,9002) (MM(I,J,K),I=1,NSPEED)                            ISC13320
      IF(ISW(24).EQ.0) THEN                                              ISC13330
      WRITE(JUNT,9502) (MM(I,J,K),I=1,NSPEED)                            ISC13340
      ENDIF                                                              ISC13350
  180 CONTINUE                                                           ISC13360
C                                                                        ISC13370
C     READ VERTICAL GRADIENT OF POTENTIAL TEMP. IN DEGREES K/METER       ISC13380
      DO 190 J=1,NSTBLE                                                  ISC13390
C***  CARD GROUP 12 (NOT READ IF TAPE INPUT)                             ISC13400
      READ (IUNT,9002) (DPDZ(I,J),I=1,NSPEED)                            ISC13410
      IF(ISW(24).EQ.0) THEN                                              ISC13420
      WRITE(JUNT,9502) (DPDZ(I,J),I=1,NSPEED)                            ISC13430
      ENDIF                                                              ISC13440
  190 CONTINUE                                                           ISC13450
C                                                                        ISC13460
C     READ MISC. PARAMETERS                                              ISC13470
C***  CARD GROUP 13 (NOT READ IF TAPE INPUT)                             ISC13480
      READ (IUNT,9002) ROTATE,TK,ZR,G,DECAY                              ISC13490
      IF(ISW(24).EQ.0) THEN                                              ISC13500
      WRITE(JUNT,9502) ROTATE,TK,ZR,G,DECAY                              ISC13510
      ENDIF                                                              ISC13520
C     SET DECAY IF REG. DEFAULT OPTION CHOSEN                            ISC13530
      IF(ISW(22).NE.0) GO TO 195                                         ISC13540
      IF(ISW(23).NE.0) GO TO 195                                         ISC13550
      IF(ISW(9).EQ.0.OR.ISW(9).EQ.3) GO TO 195                           ISC13560
      DECAY=.0000481                                                     ISC13570
  195 CONTINUE                                                           ISC13580
C                                                                        ISC13590
C     READ WIND SPEED IN MPS                                             ISC13600
C***  CARD GROUP 14 (NOT READ IF TAPE INPUT)                             ISC13610
      READ (IUNT,9002) (UBAR(I),I=1,NSPEED)                              ISC13620
      IF(ISW(24).EQ.0) THEN                                              ISC13630
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      WRITE(JUNT,9502) (UBAR(I),I=1,NSPEED)                                 ISC13640
      ENDIF                                                                 ISC13650
C                                                                           ISC13660
C     READ WIND DIRECTION SECTOR ANGLES (DEGREES)                           ISC13670
C***  CARD GROUP 15 (NOT READ IF TAPE INPUT)                                ISC13680
      READ (IUNT,9002) (PHI(I),I=1,NSCTOR)                                  ISC13690
      IF(ISW(24).EQ.0) THEN                                                 ISC13700
      WRITE(JUNT,9502) (PHI(I),I=1,NSCTOR)                                  ISC13710
      ENDIF                                                                 ISC13720
C                                                                           ISC13730
C     READ WIND SPEED POWER LAW EXPONENTS                                   ISC13740
      DO 200 J=1,NSTBLE                                                     ISC13750
C***  CARD GROUP 16 (NOT READ IF TAPE INPUT)                                ISC13760
      READ (IUNT,9002) (P(I,J),I=1,NSPEED)                                  ISC13770
      IF(ISW(24).EQ.0) THEN                                                 ISC13780
      WRITE(JUNT,9502) (P(I,J),I=1,NSPEED)                                  ISC13790
      ENDIF                                                                 ISC13800
  200 CONTINUE                                                              ISC13810
      GO TO 230                                                             ISC13820
C                                                                           ISC13830
C   * TAPE INPUT SECTION *                                                  ISC13840
C                                                                           ISC13850
  210 READ (MUNT) (X(I),I=1,NXPS)                                           ISC13860
      READ (MUNT) (Y(I),I=1,NYPS)                                           ISC13870
      IF (ISW(4) .NE. 0) READ (MUNT) (Z(I),I=1,NXXYYP)                      ISC13880
      IF (ISW(25) .NE. 0) READ (MUNT) (RHT(I),I=1,NXXYYP)                   ISC13890
      IF (ISW(12) .LE. 0.OR.NXWY .LE. 0) GO TO 220                          ISC13900
      NXWYPT = NXWY                                                         ISC13910
C***  CARD GROUP 6A,7A,8A, AND 8B FOR MAXIMUMS WITH TAPE INPUT              ISC13920
C     READ 1 CARD FOR EACH DISCRETE RECEPTOR                                ISC13930
C     IF ELEVATIONS ARE NOT DESIRED, LEAVE THE THIRD VALUE ON EACH CARD     ISC13940
C     BLANK.  IF RECEPTOR HEIGHTS ABOVE GROUND ARE NOT DESIRED, LEAVE       ISC13950
C     THE LAST ENTRY ON EACH CARD BLANK.                                    ISC13960
      DO 215 I=1,NXWYPT                                                     ISC13970
  215 READ(IUNT,9002) X(I),Y(I),Z(I),RHT(I)                                 ISC13980
      NXPS = NXWYPT                                                         ISC13990
      NYPS = NXWYPT                                                         ISC14000
      NXXYY = 0                                                             ISC14010
      NXXYYP = NXWYPT                                                       ISC14020
      NXPNTS = 0                                                            ISC14030
      NYPNTS = 0                                                            ISC14040
  220 CONTINUE                                                              ISC14050
      READ (MUNT) (FFQ(I),I=1,NMET)                                         ISC14060
  230 IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 240                         ISC14070
C                                                                           ISC14080
C     WRITE OUTPUT TAPE                                                     ISC14090
      WRITE (MUNT) (X(I),I=1,NXPS)                                          ISC14100
      WRITE (MUNT) (Y(I),I=1,NYPS)                                          ISC14110
      IF (ISW(4) .NE. 0) WRITE (MUNT) (Z(I),I=1,NXXYYP)                     ISC14120
      IF (ISW(25) .NE. 0) WRITE (MUNT) (RHT(I),I=1,NXXYYP)                  ISC14130
      WRITE (MUNT) (FFQ(I),I=1,NMET)                                        ISC14140
  240 CONTINUE                                                              ISC14150
C                                                                           ISC14160
C     DEFAULT INPUT DATA                                                    ISC14170
C*************************************************************************ISC14180
C     WIND SPEED                                                            ISC14190
      DO 250 I=1,NSPEED                                                     ISC14200
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  250 IF (UBAR(I) .LE. 0.0) UBAR(I) = UBRS(I)                          ISC14210
C     WIND PROFILE POWER LAW EXPONENT                                  ISC14220
      DO 280 J=1,NSTBLE                                                ISC14230
      IF(P(1,J) .NE. 0.0.AND.ISW(22).NE.0) GO TO 260                   ISC14240
      I = ISTBLE(J)                                                    ISC14250
      IF (ISW(9) .EQ. 2.AND.J .GT. 1) I = I+1                          ISC14260
C     SET URBAN OR RURAL DEFAULT WIND PROFILE EXPONENTS                ISC14270
      IF(ISW(9).EQ.0.OR.ISW(9).EQ.3) THEN                              ISC14280
      P(1,J)=PPR(I)                                                    ISC14290
      ELSE                                                             ISC14300
      P(1,J)=PPU(I)                                                    ISC14310
      ENDIF                                                            ISC14320
  260 C7 = P(1,J)                                                      ISC14330
      IF(C7 .LT. 0.0) P(1,J) = 0.0                                     ISC14340
      DO 270 I=2,NSPEED                                                ISC14350
      IF(P(I,J).EQ.0.0.OR.ISW(22).EQ.0) P(I,J)=C7                      ISC14360
      C7 = P(I,J)                                                      ISC14370
      IF (P(I,J) .LT. 0.0) P(I,J) = 0.0                                ISC14380
  270 CONTINUE                                                         ISC14390
  280 CONTINUE                                                         ISC14400
C     TK AND UNITS                                                     ISC14410
      IF (TK .GT. 0.0) GO TO 320                                       ISC14420
      TK = 1.0E6                                                       ISC14430
      IF (ISW(1) .EQ. 2) GO TO 300                                     ISC14440
      DO 290 I=1,20                                                    ISC14450
  290 UNITS(I) = UNIT(I)                                               ISC14460
      GO TO 320                                                        ISC14470
  300 TK = 1.0                                                         ISC14480
      DO 310 I=1,20                                                    ISC14490
  310 UNITS(I) = UNIS(I)                                               ISC14500
  320 CONTINUE                                                         ISC14510
      IF (G .LE. 0.0) G = 9.8                                          ISC14520
      IF (ZR .LE. 0.0) ZR = 10.0                                       ISC14530
      ZRMIN = ZR                                                       ISC14540
      IF (ZRMIN .GT. 10.0) ZRMIN = 10.0                                ISC14550
C     WIND DIRECTION                                                   ISC14560
      IF (PHI(1) .GT. 0.0.OR.PHI(2) .GT. 0.0) GO TO 340                ISC14570
      DO 330 I = 1,NSCTOR                                              ISC14580
  330 PHI(I) = 22.5 * FLOAT(I-1)                                       ISC14590
C     VERTICAL GRADIENT OF POTENTIAL TEMP.                             ISC14600
  340 DO 370 J=1,NSTBLE                                                ISC14610
      IF (DPDZ(1,J) .NE. 0.0) GO TO 350                                ISC14620
      I = ISTBLE(J)                                                    ISC14630
      IF (ISW(9) .EQ. 2.AND.J .GT. 1) I = I + 1                        ISC14640
      IF (I .LT. 5) GO TO 350                                          ISC14650
      DPDZ(1,J) = STBLE(I-4)                                           ISC14660
  350 C7 = DPDZ(1,J)                                                   ISC14670
      IF(C7 .LT. 0.0) DPDZ(1,J) = 0.0                                  ISC14680
      DO 360 I=2,NSPEED                                                ISC14690
      IF (DPDZ(I,J) .EQ. 0.0) DPDZ(I,J) = C7                           ISC14700
      C7 = DPDZ(I,J)                                                   ISC14710
      IF (DPDZ(I,J) .LT. 0.0) DPDZ(I,J) = 0.0                          ISC14720
  360 CONTINUE                                                         ISC14730
  370 CONTINUE                                                         ISC14740
C     IF REG. DEFAULT OPTION CHOSEN, FORCE DEFAULT                     ISC14750
C     VALUE OF DPDZ.                                                   ISC14760
      IF(ISW(22).EQ.0) THEN                                            ISC14770
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      DO 378 J=1,NSTBLE                                                 ISC14780
      IS=ISTBLE(J)                                                      ISC14790
      IF(IS.LT.5) THEN                                                  ISC14800
      DO 375 I=1,NSPEED                                                 ISC14810
  375 DPDZ(I,J)=0.                                                      ISC14820
      ELSE                                                              ISC14830
      DO 377 I=1,NSPEED                                                 ISC14840
  377 DPDZ(I,J)=STBLE(IS-4)                                             ISC14850
      ENDIF                                                             ISC14860
  378 CONTINUE                                                          ISC14870
      ENDIF                                                             ISC14880
C     TEMPERATURE                                                       ISC14890
      DO 380 J=1,NSEASN                                                 ISC14900
      C7 = TA(1,J)                                                      ISC14910
      DO 380 I=2,NSTBLE                                                 ISC14920
      IF (TA(I,J) .GT. 0.0) C7 = TA(I,J)                                ISC14930
      IF (TA(I,J) .LE. 0.0) TA(I,J) = C7                                ISC14940
  380 CONTINUE                                                          ISC14950
C     MIXING LAYER HEIGHT                                               ISC14960
      C8 = 0.0                                                          ISC14970
      DO 390 K=1,NSEASN                                                 ISC14980
      DO 390 J=1,NSTBLE                                                 ISC14990
      IF (ISW(9) .EQ. 3.AND.ISTBLE(J) .GE. 5) HM(1,J,K) = 1.0E4         ISC15000
      IF (ISW(9) .EQ. 4 .AND. ISTBLE(J) .GE. 5) HM(1,J,K)=1.0E4         ISC15010
      IF (HM(1,J,K) .LE. 0.0) HM(1,J,K) = C8                            ISC15020
      C7 = HM(1,J,K)                                                    ISC15030
      C8 = C7                                                           ISC15040
      DO 390 I=2,NSPEED                                                 ISC15050
      IF (HM(I,J,K) .GT. 0.0) C7 = HM(I,J,K)                            ISC15060
      IF (HM(I,J,K) .LE. 0.0) HM(I,J,K) = C7                            ISC15070
      IF (ISW(9) .EQ. 3.AND.ISTBLE(J) .GE. 5) HM(I,J,K) = 1.0E4         ISC15080
      IF (ISW(9) .EQ. 4 .AND. ISTBLE(J) .GE. 5) HM(I,J,K)=1.0E4         ISC15090
  390 CONTINUE                                                          ISC15100
      DO 430 L=1,NSEASN                                                 ISC15110
      A1 = 0.0                                                          ISC15120
      DO 400 K=1,NSTBLE                                                 ISC15130
      M = 4*(K-1)+L                                                     ISC15140
      DO 400 J=1,NSCTOR                                                 ISC15150
      DO 400 I=1,NSPEED                                                 ISC15160
  400 A1 = A1+FREQ(I,J,M)                                               ISC15170
      IF (0.99 .LE. A1.AND.A1 .LE. 1.01) GO TO 410                      ISC15180
      CALL TITLR(1,3,1)                                                 ISC15190
      WRITE (JUNT,9006) L,A1                                            ISC15200
  410 A1 = 1.0/A1                                                       ISC15210
      DO 420 K=1,NSTBLE                                                 ISC15220
      M = 4*(K-1)+L                                                     ISC15230
      DO 420 J=1,NSCTOR                                                 ISC15240
      DO 420 I=1,NSPEED                                                 ISC15250
  420 FREQ(I,J,M) = FREQ(I,J,M)*A1                                      ISC15260
  430 CONTINUE                                                          ISC15270
C                                                                       ISC15280
C     WRITE INPUT DATA                                                  ISC15290
C*************************************************************************ISC15300
      IF (ISW(6) .EQ. 0.OR.ISW(6) .EQ. 2) GO TO 630                     ISC15310
      CALL TITLR(8,2,2)                                                 ISC15320
      WRITE (JUNT,9004) NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,      ISC15330
     1NSTBLE,NSCTOR,NOFILE                                              ISC15340
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      IF (ISW(9) .EQ. 0) GO TO 440                                      ISC15350
      J = ISW(9)                                                        ISC15360
      CALL TITLR(1,2,0)                                                 ISC15370
      WRITE (JUNT,9005) (MSG1(I,J),I=1,3)                               ISC15380
  440 CALL TITLR(8,2,0)                                                 ISC15390
      WRITE (JUNT,9007) TK,G,ZR,ROTATE,DECAY                            ISC15400
      WRITE (JUNT,9008) ISW                                             ISC15410
      IF (NGROUP .LE. 0) GO TO 480                                      ISC15420
      LINE = 23                                                         ISC15430
      KK = 0                                                            ISC15440
      DO 470 J=1,NGROUP                                                 ISC15450
      K = NOCOMB(J)                                                     ISC15460
      IF (J .GT. 1) KK = KK+NOCOMB(J-1)                                 ISC15470
      IF (K .EQ. 0) GO TO 460                                           ISC15480
      J1 = 1                                                            ISC15490
      J2 = K                                                            ISC15500
      IF (J2 .GT. 10) J2 = 10                                           ISC15510
      CALL TITLR(1,2,0)                                                 ISC15520
      WRITE (JUNT,9031) J,(IDSORC(I+KK),I=J1,J2)                        ISC15530
  450 J1 = J2                                                           ISC15540
      J1 = J1+1                                                         ISC15550
      IF (J1 .GT. K) GO TO 470                                          ISC15560
      J2 = J1+9                                                         ISC15570
      IF (J2 .GT. K) J2 = K                                             ISC15580
      CALL TITLR(1,2,0)                                                 ISC15590
      WRITE (JUNT,9032) (IDSORC(I+KK),I=J1,J2)                          ISC15600
      GO TO 450                                                         ISC15610
  460 CALL TITLR(1,2,0)                                                 ISC15620
      WRITE (JUNT,9033) J                                               ISC15630
  470 CONTINUE                                                          ISC15640
      GO TO 490                                                         ISC15650
  480 J = 1                                                             ISC15660
      IF (ISW(8) .EQ. 1) GO TO 490                                      ISC15670
      WRITE (JUNT,9033) J                                               ISC15680
  490 CONTINUE                                                          ISC15690
      IF (ISW(4) .EQ. 0) GO TO 500                                      ISC15700
      KK = 3                                                            ISC15710
      CALL OUTPT(KK,K,X,Y,Z,1)                                          ISC15720
      LINE = NLINES                                                     ISC15730
      GO TO 540                                                         ISC15740
  500 CONTINUE                                                          ISC15750
      IF (NXPNTS .LE. 0) GO TO 510                                      ISC15760
      L = 1                                                             ISC15770
      IF (ISW(2) .EQ. 2) L = 2                                          ISC15780
      I = (NXPNTS-6)/10+1                                               ISC15790
      CALL TITLR(I,2,0)                                                 ISC15800
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(1),(MSG2(I,1),I=1,6),    ISC15810
     1(MSG9(I,1),I=1,2),(X(I),I=1,NXPNTS)                               ISC15820
  510 IF (NXWYPT .LE. 0) GO TO 520                                      ISC15830
      L = 1                                                             ISC15840
      IF (ISW(3) .EQ. 2) L = 2                                          ISC15850
      I = (NXWYPT-6)/10+1                                               ISC15860
      CALL TITLR(I,2,0)                                                 ISC15870
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(1),(MSG2(I,2),I=1,6),    ISC15880
     1(MSG9(I,1),I=1,2),(X(I+NXPNTS),I=1,NXWYPT)                        ISC15890
  520 IF (NYPNTS .LE. 0) GO TO 530                                      ISC15900
      L = 1                                                             ISC15910
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      IF (ISW(2) .EQ. 2) L = 3                                          ISC15920
      J = 1                                                             ISC15930
      IF (ISW(2) .EQ. 2) J = 2                                          ISC15940
      I = (NYPNTS-6)/10+1                                               ISC15950
      CALL TITLR(I,2,0)                                                 ISC15960
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(2),(MSG2(I,1),I=1,6),    ISC15970
     1(MSG9(I,J),I=1,2),(Y(I),I=1,NYPNTS)                               ISC15980
  530 IF (NXWYPT .LE. 0) GO TO 540                                      ISC15990
      L = 1                                                             ISC16000
      IF (ISW(3) .EQ. 2) L = 3                                          ISC16010
      J = 1                                                             ISC16020
      IF (ISW(3) .EQ. 2) J = 2                                          ISC16030
      I = (NXWYPT-6)/10+1                                               ISC16040
      CALL TITLR(I,2,0)                                                 ISC16050
      WRITE (JUNT,9009) (MSG7(I,L),I=1,4),MSG8(2),(MSG2(I,2),I=1,6),    ISC16060
     1(MSG9(I,J),I=1,2),(Y(I+NYPNTS),I=1,NXWYPT)                        ISC16070
  540 CONTINUE                                                          ISC16080
      NT4 = 1                                                           ISC16090
      IF (ISW(25) .NE. 0) CALL OUTPT(3,K,X,Y,RHT,3)                     ISC16100
      CALL TITLR(5+NSEASN,2,0)                                          ISC16110
      WRITE (JUNT,9010) (I,I=1,6)                                       ISC16120
      DO 550 K=1,NSEASN                                                 ISC16130
  550 WRITE (JUNT,9011) K,(TA(I,K),I=1,NSTBLE)                          ISC16140
  560 CALL TITLR(3+NSEASN*(3+NSTBLE),2,0)                               ISC16150
      WRITE (JUNT,9012)                                                 ISC16160
      DO 570 K=1,NSEASN                                                 ISC16170
      WRITE (JUNT,9013) K,(I,I=1,6)                                     ISC16180
      DO 570 I=1,NSTBLE                                                 ISC16190
  570 WRITE (JUNT,9014) I,(HH(J,I,K),J=1,NSPEED)                        ISC16200
      DO 600 K=1,NSEASN                                                 ISC16210
      DO 600 I=1,NSTBLE                                                 ISC16220
      M = 9+NSCTOR                                                      ISC16230
      IF (K .EQ. 1.AND.I .EQ. 1) M = M+2                                ISC16240
      CALL TITLR(M,2,0)                                                 ISC16250
      IF (LINE .LE. M+4) GO TO 580                                      ISC16260
      IF (K .NE. 1.OR.I .NE. 1) GO TO 590                               ISC16270
  580 CONTINUE                                                          ISC16280
      WRITE (JUNT,9015)                                                 ISC16290
  590 WRITE (JUNT,9016) K                                               ISC16300
      WRITE (JUNT,9017) I,(J,J=1,6),(UBAR(J),J=1,6)                     ISC16310
      L = 4*(I-1)+K                                                     ISC16320
      DO 600 N=1,NSCTOR                                                 ISC16330
  600 WRITE (JUNT,9018) PHI(N),(FREQ(J,N,L),J=1,NSPEED)                 ISC16340
      CALL TITLR(5+NSTBLE,2,0)                                          ISC16350
      WRITE (JUNT,9019)                                                 ISC16360
      WRITE (JUNT,9020) (J,J=1,NSPEED)                                  ISC16370
      DO 610 I=1,NSTBLE                                                 ISC16380
  610 WRITE (JUNT,9021) I,(DPDZ(J,I),J=1,NSPEED)                        ISC16390
      CALL TITLR(5+NSTBLE,2,0)                                          ISC16400
      WRITE (JUNT,9022)                                                 ISC16410
      WRITE (JUNT,9020) (J,J=1,NSPEED)                                  ISC16420
      DO 620 I=1,NSTBLE                                                 ISC16430
  620 WRITE (JUNT,9021) I,(P(J,I),J=1,NSPEED)                           ISC16440
  630 CONTINUE                                                          ISC16450
C                                                                       ISC16460
C     CALCULATE INTERNAL MODEL CONSTANTS                                ISC16470
C*************************************************************************ISC16480
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      DO 640 N=1,NSCTOR                                                 ISC16490
      A1 = (PHI(N)-ROTATE)*RADIAN                                       ISC16500
      PHC(N) = COS(A1)                                                  ISC16510
  640 PHS(N) = SIN(A1)                                                  ISC16520
      C8 = ABS(PHI(2)-PHI(1))                                           ISC16530
      IF (C8 .LE. 0.0) C8 = 22.5                                        ISC16540
      TR = C8*RADIAN                                                    ISC16550
      TRI = 1.0/TR                                                      ISC16560
      THN = TAN(TR)                                                     ISC16570
      THNI = 1.0/TAN(0.5*TR)                                            ISC16580
      ZRI = 1.0/ZR                                                      ISC16590
      NXPSS = NXPNTS-NXXYY                                              ISC16600
      NYPSS = NYPNTS-NXXYY                                              ISC16610
      PP1 = TK*.398942281*TRI                                           ISC16620
      IF (ISW(1) .LE. 1) PP1 = PP1*2.0                                  ISC16630
      XYPU = 2.15*THNI                                                  ISC16640
      XSEA = 1.0/FLOAT(NSEASN)                                          ISC16650
C                                                                       ISC16660
C*** START SECTION THAT LOOPS OVER SOURCE COMBINATIONS.                 ISC16670
C***********************************************************************ISC16680
C                                                                       ISC16690
C     SAVE SPECIAL OPTIONS FOR MAXIMA                                   ISC16700
      IF (ISW(10) .NE. 0) GO TO 650                                     ISC16710
      ISW(11) = 0                                                       ISC16720
      ISW(12) = 0                                                       ISC16730
  650 ISW11 = ISW(11)                                                   ISC16740
      ISW12 = ISW(12)                                                   ISC16750
      ISW10 = ISW(10)                                                   ISC16760
      ISW8 = ISW(8)                                                     ISC16770
      NOTAP = 0                                                         ISC16780
C     NOTAP = 0 MEANS ALL TAPE DATA, NOT ENOUGH CORE TO HOLD ALL SOURCESISC16790
C     NOTAP > 0 MEANS ALL SOURCES IN COMBINED REPORTS SAVED IN CORE.    ISC16800
      L91 = -1                                                          ISC16810
      IF (ISW(8) .NE. 1.OR.ISW(11) .EQ. 2) L91 = NSEASN-1               ISC16820
C     L91 MAKES ROOM FOR SUM OF COMBINED SOURCES IN ARRAY CON           ISC16830
C     L92 IF=1 MAKES ROOM FOR ANNUAL SUM                                ISC16840
      NXYSEA = NXXYYP*NSEASN                                            ISC16850
      L92 = 2                                                           ISC16860
      IF (ISW(4) .GT. 0.AND.ISW(11) .EQ. 2) GO TO 660                   ISC16870
      L92 = 0                                                           ISC16880
      IF (ISW(7) .EQ. 1.OR.NSEASN .EQ. 1) GO TO 660                     ISC16890
      IF (NGROUP .EQ. 0) GO TO 660                                      ISC16900
      L92 = 1                                                           ISC16910
  660 CONTINUE                                                          ISC16920
      IF (NGROUP .EQ. 0.AND.ISW(11) .NE. 2) GO TO 690                   ISC16930
C     SEE IF CAN DO ALL COMBINATIONS IN CORE (NOTAP > 0)                ISC16940
      I = NXPS*NYPS                                                     ISC16950
      IF (ISW(4) .NE. 0) I = I+NXXYYP                                   ISC16960
      IF (ISW(25) .NE. 0) I = I+NXXYYP                                  ISC16970
      IF (L92 .EQ. 1) I = I+NXXYYP                                      ISC16980
      IF (L91 .NE. -1) I = I+NXYSEA                                     ISC16990
      NOTAP = I                                                         ISC17000
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3.OR.NSOURC .EQ. 0) GO TO 690    ISC17010
      IF (NSOURC .LT. 0) GO TO 685                                      ISC17020
      J = IEND-I                                                        ISC17030
      IF (NSOURC .LE. J/NXYSEA.AND.NSOURC .LE. 300) GO TO 690           ISC17040
      IF (NSOURC .GT. 300) GO TO 680                                    ISC17050
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      I = I+NSOURC*NSEASN*NXXYYP                                          ISC17060
C     ERROR WILL EXCEED CORE                                              ISC17070
  670 WRITE (JUNT,9034) IEND,I                                            ISC17080
      GO TO 2490                                                          ISC17090
  680 WRITE (JUNT,9035)                                                   ISC17100
      GO TO 2490                                                          ISC17110
  685 WRITE (JUNT,9045)                                                   ISC17120
  690 CONTINUE                                                            ISC17130
      IF (L92 .EQ. 1.AND.NOTAP .EQ. 0) L92 = 0                            ISC17140
      IF (L92 .EQ. 1) L91 = L91+1                                         ISC17150
      IF (NGROUP .EQ. 0) NGROUP = 1                                       ISC17160
C     START ACTUAL COMBINATIONS LOOP                                      ISC17170
      NGT = 0                                                             ISC17180
      NG = 0                                                              ISC17190
  700 NG = NG+1                                                           ISC17200
      IF (NG .GT. NGROUP) GO TO 2500                                      ISC17210
      IF (ISW(16) .EQ. 0.OR.NG .EQ. 1) LINE = NLINES                      ISC17220
      IF (NG .GT. 1) NGT = NGT+NOCOMB(NG-1)                               ISC17230
C     EACH COMBINATION MAY BE 1 OR 2 PASSES. IF ISW(11)=2 INITIALLY THEN  ISC17240
C     EACH COMBINATION TAKES TWO PASSES, ONE FOR DETERMINATION OF THE     ISC17250
C     MAXIMA AND THE SECOND FOR DISPLAY.                                  ISC17260
C                                                                         ISC17270
C     START FIRST PASS FOR COMBINATION NG                                 ISC17280
      ISW(10) = ISW10                                                     ISC17290
      ISW(11) = ISW11                                                     ISC17300
      ISW(12) = ISW12                                                     ISC17310
      IF (ISW(11) .EQ. 2) ISW(10) = 1                                     ISC17320
      ISW(8) = ISW8                                                       ISC17330
      IF (ISW(8).GE.2.AND.NOCOMB(NG).EQ.1.AND.IDSORC(NGT+1).GT.0) ISW(8)  ISC17340
     1= 1                                                                 ISC17350
      GO TO 720                                                           ISC17360
C     START SECOND PASS HERE                                              ISC17370
  710 CONTINUE                                                            ISC17380
      ISW(11) = 0                                                         ISC17390
      ISW(12) = -1                                                        ISC17400
      ISW(10) = ISW10                                                     ISC17410
  720 IF (NG .EQ. 1.AND.ISW(12) .NE. -1) GO TO 760                        ISC17420
      IF (NOTAP .NE. 0) GO TO 760                                         ISC17430
C     REWIND AND POSITION INPUT TAPE FOR ADDITIONAL PASSES                ISC17440
      REWIND MUNT                                                         ISC17450
      IF (ISW(14) .LT. 0) GO TO 750                                       ISC17460
      K = 0                                                               ISC17470
  730 K = K+1                                                             ISC17480
      IF (K .GE. NOFILE) GO TO 750                                        ISC17490
  740 READ (MUNT,END=730) (CON(I),I=1,5)                                  ISC17500
      GO TO 740                                                           ISC17510
  750 CONTINUE                                                            ISC17520
      READ (MUNT) (CON(I),I=1,72)                                         ISC17530
      READ (MUNT) (CON(I),I=1,NXPS)                                       ISC17540
      READ (MUNT) (CON(I),I=1,NYPS)                                       ISC17550
      IF (ISW(4) .GT. 0) READ (MUNT) (CON(I),I=1,NXXYYP)                  ISC17560
      IF (ISW(25) .NE. 0) READ (MUNT) (CON(I),I=1,NXXYYP)                 ISC17570
      READ (MUNT) (CON(I),I=1,NMET)                                       ISC17580
  760 KSO = 0                                                             ISC17590
      L9 = 0                                                              ISC17600
      IF (ISW8 .EQ. 1.AND.ISW11 .NE. 2) GO TO 780                         ISC17610
C     ZERO SOURCE COMBINATION ARRAYS                                      ISC17620
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      DO 770 K=1,NSEASN                                                 ISC17630
      L1 = (K-1)*NXXYYP                                                 ISC17640
      IF (L92 .EQ. 1) L1 = L1+NXXYYP                                    ISC17650
      DO 770 I=1,NXXYYP                                                 ISC17660
  770 CON(L1+I) = 0.0                                                   ISC17670
  780 CONTINUE                                                          ISC17680
C                                                                       ISC17690
C**** START LOOP  OVER CARD AND/OR TAPE INPUT SOURCE DATA               ISC17700
C*****************************************************************    ISC17710
C                                                                       ISC17720
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 790                       ISC17730
C     M1 - COUNTER FOR CARD SOURCES                                     ISC17740
      M1 = 0                                                            ISC17750
C     N1 - COUNTER FOR TAPE SOURCES                                     ISC17760
      N1 = 0                                                            ISC17770
C     K1 - COUNTER FOR TOTAL SOURCES                                    ISC17780
      K1 = 0                                                            ISC17790
C     NT - COUNTER FOR SOURCE TO OUTPUT TAPE SUMMARY TABLE              ISC17800
      NT = 0                                                            ISC17810
C     NTT - MAX. NO. SOURCES IN OUTPUT TAPE SUMMARY BUFFER              ISC17820
      NTT = 572                                                         ISC17830
C     IFLG1 - FLAG FOR END OF CARDS                                     ISC17840
      IFLG1 = 0                                                         ISC17850
C     IFLG2 - FLAG FOR END OF TAPE                                      ISC17860
      IFLG2 = 0                                                         ISC17870
C     IFLG3 - FLAG FOR READ CARD ONLY =2, READ TAPE ONLY = 3, BOTH = 1  ISC17880
      IFLG3 =1                                                          ISC17890
      IF (ISW(5) .LE. 1) IFLG2 = 1                                      ISC17900
      IF (NSOURC .EQ. 0) IFLG1 = 1                                      ISC17910
  790 CONTINUE                                                          ISC17920
      IF (NG .EQ. 1.AND.ISW(12) .NE. -1) GO TO 830                      ISC17930
      IF (NOTAP .EQ. 0) GO TO 800                                       ISC17940
C     ALL SAVED IN CORE                                                 ISC17950
      IF (KSO+1 .GT. NSOURC) GO TO 2410                                 ISC17960
      NUMS = ISAVSO(KSO+1)                                              ISC17970
      GO TO 2260                                                        ISC17980
C     NOT SAVED IN CORE REREAD TAPE                                     ISC17990
  800 READ (MUNT,END=2410) (NSOR(I),I=1,NSO)                            ISC18000
      IF (NSOR(1) .NE. 999999) GO TO 810                                ISC18010
      IF (ISW(14) .GE. 0) GO TO 800                                     ISC18020
      GO TO 2410                                                        ISC18030
  810 CONTINUE                                                          ISC18040
      DO 820 K=1,NSEASN                                                 ISC18050
      L1 = (K+L91)*NXXYYP+L9                                            ISC18060
      READ (MUNT,END=2410) (CON(L1+I),I=1,NXXYYP)                       ISC18070
  820 CONTINUE                                                          ISC18080
      GO TO 2260                                                        ISC18090
  830 CONTINUE                                                          ISC18100
C     INITIAL CALCULATION PASS                                          ISC18110
      IPR4 = 0                                                          ISC18120
      IF (IFLG3 .EQ. 3) GO TO 1130                                      ISC18130
C     HAS END OF CARD DATA OCCURRED                                     ISC18140
      IF (IFLG1 .EQ. 1) GO TO 1130                                      ISC18150
      M1 = M1+1                                                         ISC18160
      IF(NSOURC .GT. 0.AND.M1 .GT. NSOURC) GO TO 1120                   ISC18170
C                                                                       ISC18180
C     READ DATA CARD SOURCE DATA                                        ISC18190
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      READ (IUNT,9023,END=1120) NUMS1,DISP,TYPE1,QFLG1,DX1,DY1,H1,ZS1,TSISC18200
     11,VEL1,D1,HB1,BW1,WAKE1,NVS1                                      ISC18210
      IF (ISW(24) .EQ. 0) THEN                                          ISC18220
      WRITE(JUNT,9503) NUMS1,DISP,TYPE1,QFLG1,DX1,DY1,H1,ZS1,TS1,VEL1,D1ISC18230
     1,HB1,BW1,WAKE1,NVS1                                               ISC18240
      ENDIF                                                             ISC18250
      IF (NUMS1 .LT. 0) GO TO 1120                                      ISC18260
      IF (NUMS1 .EQ. 0) NUMS1 = M1                                      ISC18270
      IF (NUMS1 .GT. NUMSL) GO TO 840                                   ISC18280
      WRITE (JUNT,9041) NUMS1,NUMSL                                     ISC18290
      GO TO 2490                                                        ISC18300
  840 NUMSL = NUMS1                                                     ISC18310
      IF (DISP .LT. 3) GO TO 850                                        ISC18320
      WRITE (JUNT,9042) NUMS1                                           ISC18330
      GO TO 2490                                                        ISC18340
  850 IF (TYPE1 .LT. 3) GO TO 860                                       ISC18350
      WRITE (JUNT,9043) NUMS1                                           ISC18360
      GO TO 2490                                                        ISC18370
  860 IF (QFLG1 .LT. 4) GO TO 870                                       ISC18380
      WRITE (JUNT,9044) NUMS1                                           ISC18390
      GO TO 2490                                                        ISC18400
  870 CONTINUE                                                          ISC18410
      IF (DISP .NE. 0) GO TO 990                                        ISC18420
      IF (TYPE1 .GT. 0) GO TO 910                                       ISC18430
      IF (VEL1) 880,880,890                                             ISC18440
  880 WRITE (JUNT,9036) NUMS1                                           ISC18450
      VEL1 = 1.0E-5                                                     ISC18460
      LINE = LINE+1                                                     ISC18470
  890 IF (D1) 900,900,970                                               ISC18480
  900 WRITE (JUNT,9037) NUMS1                                           ISC18490
      GO TO 2490                                                        ISC18500
  910 IF (TYPE1 .GT. 1) GO TO 950                                       ISC18510
      IF (SIGY01) 920,920,930                                           ISC18520
  920 WRITE (JUNT,9038) NUMS1                                           ISC18530
      GO TO 2490                                                        ISC18540
  930 IF (VEL1) 940,940,970                                             ISC18550
  940 WRITE (JUNT,9039) NUMS1                                           ISC18560
      GO TO 2490                                                        ISC18570
  950 IF (X0P) 960,960,970                                              ISC18580
  960 WRITE (JUNT,9040) NUMS1                                           ISC18590
      GO TO 2490                                                        ISC18600
  970 CONTINUE                                                          ISC18610
      IF (TYPE1 .EQ. 0) GO TO 990                                       ISC18620
      IF (TYPE1 .EQ. 2) GO TO 980                                       ISC18630
C     VOLUME                                                            ISC18640
      BW1 = 4.3*SIGY01                                                  ISC18650
      GO TO 990                                                         ISC18660
C     AREA                                                              ISC18670
  980 BW1 = X0P                                                         ISC18680
      X0P = 0.0                                                         ISC18690
  990 CONTINUE                                                          ISC18700
      IF (DISP .EQ. 1) GO TO 1130                                       ISC18710
      IF (DISP .EQ. 2) GO TO 1010                                       ISC18720
      IF (NVS1 .GT. 0) GO TO 1000                                       ISC18730
      IF (ISW(1) .LE. 1) GO TO 1005                                     ISC18740
      WRITE (JUNT,9003) NUMS1                                           ISC18750
      GO TO 2490                                                        ISC18760
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 1000 CONTINUE                                                          ISC18770
C     READ PARAMETERS FOR GRAVITATIONAL DEPOSITION                     ISC18780
      READ (IUNT,9002) (VS1(I),I=1,NVS1)                               ISC18790
      IF (ISW(24).EQ.0) WRITE(JUNT,9502) (VS1(I),I=1,NVS1)             ISC18800
      READ (IUNT,9002) (FRQ1(I),I=1,NVS1)                              ISC18810
      IF (ISW(24).EQ.0) WRITE(JUNT,9502) (FRQ1(I),I=1,NVS1)            ISC18820
      READ (IUNT,9002) (GAMMA1(I),I=1,NVS1)                            ISC18830
      IF (ISW(24).EQ.0) WRITE(JUNT,9502) (GAMMA(I),I=1,NVS1)           ISC18840
 1005 IF (HB1 .EQ. 0.0) GOTO 1010                                       ISC18850
C     FIND LESSER OF HEIGHT OR WIDTH                                   ISC18860
      RL = BW1                                                         ISC18870
      IF (ABS(HB1) .LT. BW1) RL = ABS(HB1)                             ISC18880
      IF (ISW(22) .EQ. 1 .AND. HB1 .GT. 0.0) GOTO 1010                 ISC18890
      IF (H1 .GT. (ABS(HB1))+0.5*RL) THEN                              ISC18900
C     WRITE WARNING MESSAGE FOR SELECTION OF DIRECTION SPEC. BLDG. DIM. ISC18910
      IF (HB1 .LT. 0.0) THEN                                           ISC18920
      WRITE(JUNT,9046) NUMS1                                           ISC18930
      READ(IUNT,9051)                                                  ISC18940
      ENDIF                                                            ISC18950
      HB1 = ABS(HB1)                                                   ISC18960
      GOTO 1010                                                        ISC18970
      ENDIF                                                            ISC18980
      HB1 = -(ABS(HB1))                                                ISC18990
C     READ DIRECTION SPECIFIC BUILDING DIMENSIONS                      ISC19000
      IF (HB1 .LT. 0.0) THEN                                           ISC19010
      READ(IUNT,9002) (DSBH1(N),N=1,NSCTOR)                            ISC19020
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) (DSBH1(N),N=1,NSCTOR)          ISC19030
      READ(IUNT,9002) (DSBW1(N),N=1,NSCTOR)                            ISC19040
      IF(ISW(24).EQ.0) WRITE(JUNT,9502) (DSBW1(N),N=1,NSCTOR)          ISC19050
      ENDIF                                                            ISC19060
      IER = 0                                                          ISC19070
      DO 1007 N=1,NSCTOR                                               ISC19080
      IF (ABS(DSBH1(N)) .GT. 9999. .OR. ABS(DSBW1(N)) .GT. 9999.) IER=1 ISC19090
 1007 CONTINUE                                                          ISC19100
      IF (IER .EQ. 1) THEN                                             ISC19110
C     WRITE ERROR MESSAGE FOR DIRECTION SPECIFIC SEQUENCE OF CARDS     ISC19120
      WRITE(JUNT,9049) NUMS1                                           ISC19130
      IER=0                                                            ISC19140
      GOTO 2490                                                        ISC19150
      ENDIF                                                            ISC19160
 1010 QFLGS = QFLG1+1                                                   ISC19170
      IF (DISP .NE. 2.OR.QFLGS .LE. 1) GO TO 1020                      ISC19180
      WRITE (JUNT,9027) NUMS1                                          ISC19190
      GO TO 2490                                                       ISC19200
 1020 CONTINUE                                                          ISC19210
      GO TO (1030,1040,1060,1080),QFLGS                                ISC19220
C     SOURCE STRENGTH VARIES WITH SEASON ONLY                          ISC19230
 1030 READ (IUNT,9002) (Q1(1,1,K),K=1,NSEASN)                          ISC19240
      L1 = 1                                                           ISC19250
      L2 = 1                                                           ISC19260
      GO TO 1100                                                       ISC19270
 1040 DO 1050 K=1,NSEASN                                               ISC19280
C     SOURCE STRENGTH VARIES WITH SEASON AND STABILITY OR SPEED        ISC19290
 1050 READ (IUNT,9002) (Q1(1,J,K),J=1,NSTBLE)                          ISC19300
      L1 = 1                                                           ISC19310
      L2 = 0                                                           ISC19320
      GO TO 1100                                                       ISC19330
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 1060 DO 1070 K=1,NSEASN                                                ISC19340
 1070 READ (IUNT,9002) (Q1(I,1,K),I=1,NSPEED)                           ISC19350
      L1 = 0                                                            ISC19360
      L2 = 1                                                            ISC19370
      GO TO 1100                                                        ISC19380
 1080 DO 1090 K=1,NSEASN                                                ISC19390
      DO 1090 J=1,NSTBLE                                                ISC19400
C     SOURCE STRENGTH VARIES WITH SEASON, STABILITY AND SPEED           ISC19410
      READ (IUNT,9002) (Q1(I,J,K),I=1,NSPEED)                           ISC19420
 1090 CONTINUE                                                          ISC19430
      GO TO 1130                                                        ISC19440
 1100 DO 1110 K=1,NSEASN                                                ISC19450
      DO 1110 J=1,NSTBLE                                                ISC19460
      L4 = 1                                                            ISC19470
      IF (L2 .EQ. 0) L4 = J                                             ISC19480
      DO 1110 I=1,NSPEED                                                ISC19490
      L3 = 1                                                            ISC19500
      IF (L1 .EQ. 0) L3 = I                                             ISC19510
 1110 Q1(I,J,K) = Q1(L3,L4,K)                                           ISC19520
      GO TO 1130                                                        ISC19530
 1120 IFLG1 = 1                                                         ISC19540
      DISP = 0                                                          ISC19550
      IF (NSOURC .LT. 0) NSOURC = M1 - 1                                ISC19560
 1130 IF (IFLG3 .EQ. 2) GO TO 1160                                      ISC19570
C     HAS END OF TAPE DATA OCCURRED                                     ISC19580
      IF (IFLG2 .EQ. 1) GO TO 1160                                      ISC19590
C                                                                       ISC19600
C     READ TAPE SOURCE DATA                                             ISC19610
 1140 READ (IUNT,END=1150) (NSOR2(I),I=1,NSO)                           ISC19620
      IF (NSOR2(1) .NE. 999999) GO TO 1160                              ISC19630
      IF (ISW(14) .GE. 0) GO TO 1140                                    ISC19640
 1150 IFLG2 = 1                                                         ISC19650
 1160 IF (IFLG1 .EQ. 1.AND.IFLG2 .EQ. 1) GO TO 1350                     ISC19660
      IF (IFLG1 .EQ. 1) GO TO 1300                                      ISC19670
      IF (IFLG2 .EQ. 1) GO TO 1270                                      ISC19680
C     CARD AND TAPE INPUT, COMPARE SOURCE NUMBERS                       ISC19690
      IF (NUMS1 .LT. NUMS2) GO TO 1330                                  ISC19700
      IF (NUMS2 .LT. NUMS1) GO TO 1300                                  ISC19710
C     SAME SOURCE, IF DISP = 1 THEN DELETION ONLY                       ISC19720
C     IF DISP = 2 RESCALE CON (DEP)                                     ISC19730
      IFLG3 = 1                                                         ISC19740
      L3 = 1                                                            ISC19750
 1170 CONTINUE                                                          ISC19760
      IF (NOTAP .EQ. 0) GO TO 1200                                      ISC19770
      IF (L9+NOTAP+NXYSEA .LE. IEND) GO TO 1200                         ISC19780
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1190                    ISC19790
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1190                   ISC19800
 1180 CONTINUE                                                          ISC19810
      I = L9+NOTAP+NXYSEA                                               ISC19820
      GO TO 670                                                         ISC19830
 1190 NOTAP = 0                                                         ISC19840
      L9 = 0                                                            ISC19850
 1200 CONTINUE                                                          ISC19860
      DO 1210 K=1,NSEASN                                                ISC19870
      L1 = (K+L91)*NXXYYP+L9                                            ISC19880
      READ (IUNT,END=1150) (CON(L1+I),I=1,NXXYYP)                       ISC19890
 1210 CONTINUE                                                          ISC19900
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      GO TO (1220,1370 ),L3                                              ISC19910
 1220 CONTINUE                                                           ISC19920
      IF (DISP .EQ. 1) GO TO 790                                         ISC19930
      IF (DISP .NE. 2) GO TO 1250                                        ISC19940
C     RESCALE                                                            ISC19950
      DO 1240 K=1,NSEASN                                                 ISC19960
      L1 = (K+L91)*NXXYYP+L9                                             ISC19970
      C8 = Q1(1,1,K)/Q2(1,1,K)                                           ISC19980
      DO 1230 J=1,NSTBLE                                                 ISC19990
      DO 1230 I=1,NSPEED                                                 ISC20000
 1230 Q2(I,J,K) = Q1(1,1,K)                                              ISC20010
      DO 1240 I=1,NXXYYP                                                 ISC20020
      CON(L1+I) = CON(L1+I)*C8                                           ISC20030
 1240 CONTINUE                                                           ISC20040
      GO TO 1310                                                         ISC20050
 1250 CONTINUE                                                           ISC20060
C     REPLACE TAPE SOURCE WITH CARD SOURCE                               ISC20070
 1260 IF (DISP .LE. 0) GO TO 1280                                        ISC20080
      WRITE (JUNT,9028) NUMS1                                            ISC20090
      GO TO 2490                                                         ISC20100
 1270 IF (DISP .LE. 0) GO TO 1340                                        ISC20110
      WRITE (JUNT,9028) NUMS1                                            ISC20120
      GO TO 2490                                                         ISC20130
 1280 K1 = K1+1                                                          ISC20140
      ICARD = 1                                                          ISC20150
      DO 1290 I=1,NSO                                                    ISC20160
 1290 NSOR(I) = NSOR1(I)                                                 ISC20170
      GO TO 1370                                                         ISC20180
C     STORE TAPE SOURCE, HOLD CARD SOURCE                                ISC20190
 1300 IFLG3 = 3                                                          ISC20200
 1310 CONTINUE                                                           ISC20210
      ICARD = 0                                                          ISC20220
      K1 = K1+1                                                          ISC20230
      DO 1320  I=1,NSO                                                   ISC20240
 1320 NSOR(I) = NSOR2(I)                                                 ISC20250
      IF (IFLG3 .NE. 3) GO TO 1370                                       ISC20260
      L3 = 2                                                             ISC20270
      GO TO 1170                                                         ISC20280
C     STORE CARD SOURCE, HOLD TAPE SOURCE                                ISC20290
 1330 IF (DISP .LE. 0) GO TO 1340                                        ISC20300
      WRITE (JUNT,9029) NUMS1                                            ISC20310
      GO TO 2490                                                         ISC20320
 1340 IFLG3 =2                                                           ISC20330
      GO TO 1280                                                         ISC20340
C     SAVE NO. OF SOURCES USED, FOR CORE SAVED RUN                       ISC20350
 1350 NSOURC = NSO                                                       ISC20360
      IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 2410                     ISC20370
C     WRITE END OF TAPE RECORD                                           ISC20380
      NSOR(1) = 999999                                                   ISC20390
      WRITE (NUNT) (NSOR(I),I=1,NSO)                                     ISC20400
      IF (ISW(15) .LT. 0) GO TO 1360                                     ISC20410
      ENDFILE NUNT                                                       ISC20420
      ENDFILE NUNT                                                       ISC20430
      BACKSPACE NUNT                                                     ISC20440
C     THIS BACKSPACE ASSUMES THE TAPE BACKSPACES OVER THE SECOND END OF  ISC20450
C     FILE MARK.                                                         ISC20460
 1360 CONTINUE                                                           ISC20470
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C     SWITCH OUTPUT UNIT TO INPUT UNIT FOR ADDITIONAL PASSES                ISC20480
      MUNT = MUNT                                                           ISC20490
      ISW(14) = ISW(15)                                                     ISC20500
      ISW(5) = 2                                                            ISC20510
      GO TO 2410                                                            ISC20520
 1370 CONTINUE                                                              ISC20530
      IF (NOTAP .EQ. 0) GO TO 1400                                          ISC20540
      IF (KSO+1 .LE. 300) GO TO 1390                                        ISC20550
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1380                        ISC20560
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1380                       ISC20570
      GO TO 680                                                             ISC20580
 1380 NOTAP = 0                                                             ISC20590
      GO TO 1400                                                            ISC20600
 1390 ISAVSO(KSO+1) = NUMS                                                  ISC20610
 1400 CONTINUE                                                              ISC20620
C     PRINT SOURCE DATA                                                     ISC20630
      IF (ISW(6) .LE. 1) GO TO 1410                                         ISC20640
      CALL OUTPT(4,K,X,Y,CON,1)                                             ISC20650
 1410 CONTINUE                                                              ISC20660
      IF (ISW(5) .GE. 2.AND.ISW(12) .EQ. 1) GO TO 1420                      ISC20670
      IF (IFLG3 .EQ. 1.AND.DISP .EQ. 2) GO TO 2230                          ISC20680
      IF (IFLG3 .EQ. 3) GO TO 2230                                          ISC20690
 1420 CONTINUE                                                              ISC20700
      IF (NOTAP .EQ. 0) GO TO 1440                                          ISC20710
      IF (L9+NOTAP+NXYSEA .LE. IEND) GO TO 1440                             ISC20720
      IF (ISW(5) .EQ. 1.OR.ISW(5) .EQ. 3) GO TO 1430                        ISC20730
      IF (ISW(5) .EQ. 2.AND.NSOURC .EQ. 0) GO TO 1430                       ISC20740
      GO TO 1180                                                            ISC20750
 1430 NOTAP = 0                                                             ISC20760
      L9 = 0                                                                ISC20770
 1440 CONTINUE                                                              ISC20780
C                                                                           ISC20790
C     START PLUME RISE SECTION FOR STACKS, BRANCH FOR VOLUME AND AREAS.     ISC20800
C*************************************************************************ISC20810
      IF (ISW(4) .EQ. 0) ZS = 0.0                                           ISC20820
      MSW1 = 0                                                              ISC20830
      MSW2 = 0                                                              ISC20840
      DXP = DX                                                              ISC20850
      DYP = DY                                                              ISC20860
      IF (TYPE .GT. 0) GO TO 1720                                           ISC20870
C     CALCULATE CONSTANTS AND PARAMETERS FOR STACKS                         ISC20880
      R = 0.5*D                                                             ISC20890
      R0 = 0                                                                ISC20900
      X0 = 0                                                                ISC20910
      SIGZOP = 0.0                                                          ISC20920
      DO 1450 L=1,NSCTOR                                                    ISC20930
      DO 1450  I=1,NSTBLE                                                   ISC20940
 1450 XY(I,L) = 0.0                                                         ISC20950
C     DETERMINE IF WAKE EFFECTS USED, JTYPE = 0 NO WAKE EFFECTS,            ISC20960
C     JTYPE = 1 SQUAT BUILDING, JTYPE = 2 TALL BUILDING                     ISC20970
      JTYPE = 0                                                             ISC20980
C     SET SWITCH TO ALLOW USE OF DIRECTION SPECIFIC BUILDING DIMENSIONS     ISC20990
      KTYPE = 0                                                             ISC21000
      IF (HB .LT. 0.) THEN                                                  ISC21010
      KTYPE = 1                                                             ISC21020
      HB = ABS(HB)                                                          ISC21030
      ENDIF                                                                 ISC21040
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      IF (HB .EQ. 0.0) GO TO 1480                                        ISC21050
C     DETERMINE ORIGINAL BUILDING WAKE EFFECTS SWITCHES                  ISC21060
      HW = 2.0*SQRT(BW*BW*.31830988)                                     ISC21070
      C1 = 2.5*HB                                                        ISC21080
      C2 = HW*1.5+HB                                                     ISC21090
      HMIN = AMIN1(C1,C2)                                                ISC21100
      IF (HW .GE. HB) GO TO 1460                                         ISC21110
      JTYPE = 2                                                          ISC21120
      GO TO 1470                                                         ISC21130
 1460 JTYPE = 1                                                          ISC21140
 1470 CONTINUE                                                           ISC21150
      HB2 = 2.0*HB                                                       ISC21160
      HB12 = 1.2*HB                                                      ISC21170
      IF (KTYPE .EQ. 1) THEN                                             ISC21180
      KN = 0                                                             ISC21190
C     DETERMINE BUILDING WAKE EFFECTS SWITCHES BASED ON WIND SECTORS     ISC21200
      DO 1478 L=1,NSCTOR                                                 ISC21210
      DSJTYP(L) = 0                                                      ISC21220
      DSHSW1(L) = 0.                                                     ISC21230
      DSHSW2(L) = 0.                                                     ISC21240
      IF (DSBH(L) .EQ. 0.0 .AND. DSBW(L) .EQ. 0.0) GOTO 1478             ISC21250
      DSHW(L) = DSBW(L)                                                  ISC21260
      DSHMIN(L) = AMIN1(DSBH(L),DSHW(L))                                 ISC21270
      IF (DSHW(L) .GE. DSBH(L)) GO TO 1472                               ISC21280
      DSJTYP(L) = 2                                                      ISC21290
      GO TO 1475                                                         ISC21300
 1472 DSJTYP(L) = 1                                                      ISC21310
 1475 CONTINUE                                                           ISC21320
      DSHB2(L) = 2.0*DSBH(L)                                             ISC21330
      DSHB12(L) = 1.2*DSBH(L)                                            ISC21340
      HWOHB = DSHW(L)/DSBH(L)                                            ISC21350
C     CHECK DIRECT. SPEC. CONDITIONS FOR UPPER BOUNDS WAKE SWITCH        ISC21360
      IF (HWOHB .GT. 5 .AND. IWAKSW(L) .NE. 1) THEN                      ISC21370
      KN = KN + 1                                                        ISC21380
      DSUBCK(KN) = L                                                     ISC21390
      ENDIF                                                              ISC21400
 1478 CONTINUE                                                           ISC21410
      ENDIF                                                              ISC21420
C     PLUME RISE EQUATION PARTS                                          ISC21430
 1480 C1 = VEL*R*R                                                       ISC21440
      C2 = C1*VEL                                                        ISC21450
      C1 = C1*G                                                          ISC21460
      HP = H                                                             ISC21470
      IF (HP .LT. ZRMIN) HP = ZRMIN                                      ISC21480
      C3 = HP*ZRI                                                        ISC21490
      C13 = 6.0*VEL*R                                                    ISC21500
      VELI = 1.0/VEL                                                     ISC21510
      C4 = 6.0*R*VELI                                                    ISC21520
C     CALC PARAMETERS FOR PLUME RISE                                     ISC21530
      VEL2D = 2.0*D*VEL                                                  ISC21540
      D3 = 3.0*D                                                         ISC21550
      DO 1610 I =1,NSTBLE                                                ISC21560
      DO 1610 J=1,NSPEED                                                 ISC21570
C     UBAR AT H                                                          ISC21580
      UBH = UBAR(J)*C3**P(J,I)                                           ISC21590
      UBHI(J,I) = 1.0/UBH                                                ISC21600
      HBRIG(J,I) = H                                                     ISC21610
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C     NO STACK TIP DOWNWASH IF DIRECTION SPECIFIC BLDG. DOWNWASH IS USEDISC21620
      IF (KTYPE .EQ. 1 .AND. ISW(20) .EQ. 1) GOTO 1550                  ISC21630
      IF (ISW(20) .EQ. 1.AND.VEL .LT. 1.5*UBH) HBRIG(J,I) = H+VEL2D*UBHISC21640
     1(J,I)-D3                                                          ISC21650
      IF(HBRIG(J,I).LT.0.0) HBRIG(J,I)=0.0                              ISC21660
 1550 C8 = C4*(VEL+3.0*UBH)**2*UBHI(J,I)                                ISC21670
      C9 = G*DPDZ(J,I)                                                  ISC21680
      DO 1610 K=1,NSEASN                                                ISC21690
      T = TS                                                            ISC21700
      IF (T .LE. 0.0) T = ABS(T)+TA(I,K)                                ISC21710
      C11 = TA(I,K)/T                                                   ISC21720
C     BUOYANCY TERM                                                     ISC21730
      F = C1*(1.0-C11)                                                  ISC21740
      IF(F.LT.0.0) F=0.0                                                ISC21750
C     MOMENTUM TERM                                                     ISC21760
      FM=C2*C11                                                         ISC21770
      BETAJ=1./3.+UBH*VELI                                              ISC21780
      BETAJ=BETAJ*BETAJ                                                 ISC21790
      BETAJI=1./BETAJ                                                   ISC21800
      M = 4*(K-1)                                                       ISC21810
      IF (KTYPE .EQ. 0) THEN                                            ISC21820
C     DO ORIGINAL SINGLE BUILDING DOWNWASH WAKE EFFECTS CALCULATIONS    ISC21830
C     MPR1LT IS A SUBROUTINE THAT CALCULATES FINAL PLUME RISE           ISC21840
C     IN A MANNER CONSISTENT WITH THE MPTER MODEL.                      ISC21850
C     DELH(J,I,L,M+1) IS FINAL PLUME RISE.                              ISC21860
C     DELH(J,I,L,M+2) IS DISTANCE TO FINAL RISE.                        ISC21870
C     DELH(J,I,L,M+3) AND DELH(J,I,L,M+4) ARE FLAGS FOR                 ISC21880
C     BUILDING WAKE EFFECTS CALCULATIONS.                               ISC21890
      CALL MPR1LT(I,T,TA(I,K),F,D,VEL,UBH,DELH(J,I,1,M+1),              ISC21900
     1  DPDZ(J,I),DELH(J,I,1,M+2))                                      ISC21910
      DELH(J,I,1,M+3)=1.                                                ISC21920
      DELH(J,I,1,M+4)=1.                                                ISC21930
C     IF NO BUILDING THEN SKIP BUILDING DOWNWASH CALCULATIONS           ISC21940
      IF (JTYPE .EQ. 0) GO TO 1610                                      ISC21950
C     CALC. PLUME RISE DUE TO MOMENTUM FOR WAKE EFFECTS CALCULATIONS    ISC21960
C     USING UNAMAP 5 ISC MOMENTUM RISE                                  ISC21970
      XB = HB2                                                          ISC21980
      IF(C9.GT.0.0) GO TO 1570                                          ISC21990
C     UNSTABLE CONDITIONS                                               ISC22000
C     CALCULATE MAX DOWNWIND DISTANCE                                   ISC22010
      IF(F.LE.0.) THEN                                                  ISC22020
      DMAX=4.*D*VELI*UBHI(J,I)*(VEL+3.*UBH)**2                          ISC22030
      ELSE                                                              ISC22040
      XSTAR=34.*F**.4                                                   ISC22050
      IF(F.LE.55.) XSTAR=14.*F**.625                                    ISC22060
      DMAX=3.5*XSTAR                                                    ISC22070
      ENDIF                                                             ISC22080
      IF(XB.GT.DMAX) XB=DMAX                                            ISC22090
      HP=3.*FM*XB*BETAJI*UBHI(J,I)*UBHI(J,I)                            ISC22100
      HP=HP**.33333333                                                  ISC22110
      GO TO 1580                                                        ISC22120
C     STABLE CONDITIONS                                                 ISC22130
 1570 S=C9/TA(I,K)                                                      ISC22140
      SSQ=SQRT(S)                                                       ISC22150
      SSQI=1./SSQ                                                       ISC22160
      DMAX=3.1415926*UBH*SSQI                                           ISC22170
      IF(F.LE.0.) DMAX=DMAX*.5                                          ISC22180
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      IF(XB.GT.DMAX) XB=DMAX                                              ISC22190
      HP=AMAX1(1.E-10,3.*FM*BETAJI*UBHI(J,I)*SSQI*SIN(SSQ*XB*UBHI(J,I)))ISC22200
      HP=HP**.33333333                                                    ISC22210
C     HP1 IS MAX ISC MOMENTUM RISE                                        ISC22220
 1580 HP1=3.*VEL*D*UBHI(J,I)                                              ISC22230
      IF(HP.GT.HP1) HP=HP1                                                ISC22240
      HP=HP+H                                                             ISC22250
      IF (HP .GT. HMIN) GO TO 1590                                        ISC22260
      NSW1 = 1                                                            ISC22270
C     SET FLAG TO MODIFY SIGZ                                             ISC22280
      DELH(J,I,1,M+3) = -DELH(J,I,1,M+3)                                  ISC22290
      IF (HP .GT. HB12) GO TO 1600                                        ISC22300
C     SET FLAG TO MODIFY XY                                               ISC22310
      DELH(J,I,1,M+4) = -DELH(J,I,1,M+4)                                  ISC22320
      GO TO 1600                                                          ISC22330
 1590 NSW2 = 1                                                            ISC22340
 1600 CONTINUE                                                            ISC22350
      ELSE                                                                ISC22360
C     DO DIRECTION SPECIFIC BUILDING DOWNWASH WAKE EFFECTS                ISC22370
      DO 1608 L=1,NSCTOR                                                  ISC22380
C     SET BLDG WAKE EFFECTS FLAGS FOR DEFAULT TO ORIGINAL CALC.           ISC22390
      DELH(J,I,L,M+3) = 1.                                                ISC22400
      DELH(J,I,L,M+4) = 1.                                                ISC22410
      IF (DSJTYP(L) .EQ. 0) GOTO 1608                                     ISC22420
C     CALC. PLUME RISE DUE TO MOMENTUM FOR WAKE EFFECTS CALCULATIONS      ISC22430
C     USING UNAMAP 5                                                      ISC22440
      IF(C9.GT.0.0) GO TO 1602                                            ISC22450
C     UNSTABLE CONDITIONS                                                 ISC22460
C     CALCULATE MAX DOWNWIND DISTANCE                                     ISC22470
      IF(F.LE.0.) THEN                                                    ISC22480
      DMAX=4.*D*VELI*UBHI(J,I)*(VEL+3.*UBH)**2                            ISC22490
      ELSE                                                                ISC22500
      XSTAR=34.*F**.4                                                     ISC22510
      IF(F.LE.55.) XSTAR=14.*F**.625                                      ISC22520
      DMAX=3.5*XSTAR                                                      ISC22530
      ENDIF                                                               ISC22540
      IF(DSHB2(L).GT.DMAX) DSHB2(L)=DMAX                                  ISC22550
      DSHP(L)=3.*FM*DSHB2(L)*BETAJI*UBHI(J,I)*UBHI(J,I)                   ISC22560
      DSHP(L)=DSHP(L)**.33333333                                          ISC22570
      GO TO 1604                                                          ISC22580
C     STABLE CONDITIONS                                                   ISC22590
 1602 S=C9/TA(I,K)                                                        ISC22600
      SSQ=SQRT(S)                                                         ISC22610
      SSQI=1./SSQ                                                         ISC22620
      DMAX=3.1415926*UBH*SSQI                                             ISC22630
      IF(F.LE.0.) DMAX=DMAX*.5                                            ISC22640
      IF(DSHB2(L).GT.DMAX) DSHB2(L)=DMAX                                  ISC22650
      DSHP(L)=AMAX1(1.E-10,3.*FM*BETAJI*UBHI(J,I)*SSQI*SIN(SSQ*DSHB2(L)*ISC22660
     1UBHI(J,I)))                                                         ISC22670
      DSHP(L)=DSHP(L)**.33333333                                          ISC22680
C     HP1 IS MAX ISC MOMENTUM RISE                                        ISC22690
 1604 HP1=3.*VEL*D*UBHI(J,I)                                              ISC22700
      IF(DSHP(L).GT.HP1) DSHP(L)=HP1                                      ISC22710
      DSHP(L)=DSHP(L)+H                                                   ISC22720
      IF (DSHP(L).GE.3.*DSBH(L).OR. DSHP(L).GE.3.*DSHW(L)) GOTO 1606      ISC22730
      DSNSW1(L) = 1                                                       ISC22740
C     SET FLAGS TO MODIFY SIGZ AND XY                                     ISC22750
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      DELH(J,I,L,M+3) = -DELH(J,I,L,M+3)                                ISC22760
      IF (DSHP(L) .GT. DSHB12(L)) GOTO 1608                             ISC22770
      DELH(J,I,L,M+4) = -DELH(J,I,L,M+4)                                ISC22780
      GOTO 1608                                                         ISC22790
 1606 DSHSW2(L) = 1                                                     ISC22800
 1608 CONTINUE                                                          ISC22810
      ENDIF                                                             ISC22820
 1610 CONTINUE                                                          ISC22830
      B2 = 0.067                                                        ISC22840
      IF (KTYPE .EQ. 1) GOTO 1780                                       ISC22850
C     DO ORIGINAL WAKE EFFECTS COEFFICIENTS ADJUSTMENTS                 ISC22860
      IF (NSW1 .EQ. 0) JTYPE = 0                                        ISC22870
      IF (NSW1 .EQ. 1.AND.NSW2 .EQ. 0) NSW2 = -1                        ISC22880
      XMX = 0.0                                                         ISC22890
      IF (JTYPE .EQ. 0) GO TO 1770                                      ISC22900
C     WAKE EFFECTS COEFFICIENTS TO CALC SIGZ AND XY                     ISC22910
C     FOR DISTANCES LESS THAN 10HB (SQUAT) OR 10HW (TALL)               ISC22920
      HWOHB = HW/HB                                                     ISC22930
      C6 = HW                                                           ISC22940
      IF (JTYPE .EQ. 1) C6 = HB                                         ISC22950
      X6X = 3.0*C6                                                      ISC22960
C     COEFFICIENTS FOR SIGZ ( SIGZ = B1+B2*X )                          ISC22970
      B1 = 0.499*C6                                                     ISC22980
C     COEFFICIENTS FOR XY ( XY = 2.15*SIGYO/COT(.5*DELTA THETA) )       ISC22990
C          (WHERE  SIGYO = B3+B2*X )                                    ISC23000
      IF (JTYPE .EQ. 2) GO TO 1640                                      ISC23010
      IF (HWOHB .GT. 5) GO TO 1620                                      ISC23020
      B3 = 0.35*HW-0.201*HB                                             ISC23030
      GO TO 1660                                                        ISC23040
 1620 IF (WAKE .EQ. 1) GO TO 1640                                       ISC23050
C     SET FLAG TO PRINT MESSAGE THAT UPPER BOUND EQUATIONS USED         ISC23060
      IPR4 = 1                                                          ISC23070
      B3 = 0.47*HB                                                      ISC23080
      GO TO 1660                                                        ISC23090
 1640 B3 = 1.549*HB                                                     ISC23100
      GO TO 1660                                                        ISC23110
 1650 B3 = 0.149*HW                                                     ISC23120
 1660 CONTINUE                                                          ISC23130
C     FOR DISTANCES GREATER THAN OR EQUAL TO 10HB (SQUAT) OR 10HW (TALL)ISC23140
      SIGZOP = 1.2*C6                                                   ISC23150
      C7 = 10.0*C6                                                      ISC23160
      DO 1710 I=1,NSTBLE                                                ISC23170
C     XZ IS DEPENDENT ON DISTANCE AND IS CALCULATED BELOW IN MAIN MODEL  ISC23180
C     CALCULATIONS                                                      ISC23190
C     CALC XY                                                           ISC23200
      IF (JTYPE .EQ. 2) GO TO 1690                                      ISC23210
      IF (HWOHB .GT. 5.0) GO TO 1670                                    ISC23220
      C5 = 0.35*HW+0.5*HB                                               ISC23230
      GO TO 1700                                                        ISC23240
 1670 IF (WAKE .EQ. 1) GO TO 1680                                       ISC23250
      C5 = 0.85*HB                                                      ISC23260
      GO TO 1700                                                        ISC23270
 1680 C5 = 2.25*HB                                                      ISC23280
      GO TO 1700                                                        ISC23290
 1690 C5 = 0.85*HW                                                      ISC23300
 1700 CONTINUE                                                          ISC23310
      IF(ISW(9) .NE. 4) XY(I,1)=VIRTY(C5*2.15,ISTBLE(I))-C7             ISC23320
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      IF (ISW(9) .EQ. 4) XY(I,1)=XVY(C5*2.15,ISTBLE(I))-C7              ISC23330
      IF (XY(I,1) .LT. 0.0) XY(I,1) = 0.0                               ISC23340
 1710 CONTINUE                                                          ISC23350
      HB10 = C7                                                         ISC23360
      GO TO 1770                                                        ISC23370
C     VOLUME OR AREA EMISSIONS                                          ISC23380
C*************************************************************************ISC23390
C     CALCULATE CONSTANTS AND PARAMETERS FOR VOLUME AND AREA SOURCES.   ISC23400
C     CALCULATE INVERSE UBAR AT H                                       ISC23410
 1720 CONTINUE                                                          ISC23420
      HP = H                                                            ISC23430
      IF (HP .LT. ZRMIN) HP = ZRMIN                                     ISC23440
      C3 = HP*ZRI                                                       ISC23450
      DO 1730 I=1,NSTBLE                                                ISC23460
      DO 1730 J=1,NSPEED                                                ISC23470
 1730 UBHI(J,I) = 1.0/(UBAR(J)*C3**P(J,I))                              ISC23480
C     CALC EFFECTIVE AREA                                               ISC23490
      X0 = BW*BW                                                        ISC23500
C     CALC EFFECTIVE RADIUS                                             ISC23510
      R0 = SQRT(X0*.31830988)                                           ISC23520
      IF (TYPE .EQ. 2) GO TO 1750                                       ISC23530
C     VOLUME SOURCES (VIRTUAL DISTANCES)                                ISC23540
      XMX = 001.0+2.15*SIGYO                                            ISC23550
      SIGZOP = SIGZO                                                    ISC23560
C     XZ = VIRTZ(SIGZOP,ISTBLE(I),XB) , XB = DISTANCE                   ISC23570
      DO 1740 I=1,NSTBLE                                                ISC23580
      IF(ISW(9) .NE. 4) XY(I,1)=VIRTY(SIGYO,ISTBLE(I))                  ISC23590
      IF(ISW(9) .EQ. 4) XY(I,1)=XVY(SIGYO,ISTBLE(I))                    ISC23.00
 1740 CONTINUE                                                          ISC23610
      GO TO 1770                                                        ISC23620
C     AREA SOURCES (VIRTUAL DISTANCES)                                  ISC23630
 1750 C9 = R0*TNNI                                                      ISC23640
      DXP = DXP+0.5*BW                                                  ISC23650
      DYP = DYP+0.5*BW                                                  ISC23660
      XMX = 001.0+0.5*BW                                                ISC23670
C     XZ = BW, WIDTH OF AREA SOURCE                                     ISC23680
      DO 1760 I=1,NSTBLE                                                ISC23690
      XY(I,1) = C9                                                      ISC23700
 1760 CONTINUE                                                          ISC23710
C                                                                       ISC23720
C     ALL SOURCE TYPES MERGE HERE                                       ISC23730
C*************************************************************************ISC23740
 1770 C1 =   1.0                                                        ISC23750
C     MINIMUM CALCULATION DISTANCE                                      ISC23760
      XMX = AMAX1(XMX,C1)                                               ISC23770
      IF (IPR4 .EQ. 0) GO TO 1780                                       ISC23780
      JJ = 3                                                            ISC23790
      IF (ISW(6) .GE. 2) JJ = 1                                         ISC23800
      CALL TITLR(3,JJ,0)                                                ISC23810
      WRITE (JUNT,9030) NUMS                                            ISC23820
 1780 CONTINUE                                                          ISC23830
      IF (KTYPE .EQ. 1 .AND. KN .GT. 0) THEN                            ISC23840
C     WRITE WARNING MESSAGE ABOUT USE OF UPPER BOUNDS EQ. FOR DIR. SPEC.ISC23850
      LL=5                                                              ISC23860
      IF (ISW(6) .GE. 2) LL=1                                           ISC23870
      CALL TITLR(3,LL,0)                                                ISC23880
      WRITE(JUNT,9048) NUMS,(DSUBCK(N),N=1,KN)                          ISC23890
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      WRITE(JUNT,9050)                                                  ISC23900
      ENDIF                                                             ISC23910
      IF (ISW(4) .EQ. 0) ZS = 0.0                                       ISC23920
      IDP = 0                                                           ISC23930
      IF (NVS .GT. 0.OR.ISW(1) .EQ. 2) IDP = 1                          ISC23940
      C1 = PPI                                                          ISC23950
      IF (TYPE .EQ. 2) C1 = C1*X0                                       ISC23960
      IF (NVS .GT. 0.AND.ISW(1) .LE. 1) C1 = 0.5*C1                     ISC23970
C                                                                       ISC23980
C     LOOP OVER Y GRID COORDINATES                                      ISC23990
C*****************************************************************    ISC24000
      IF (NYPNTS .LE. 0) GO TO 1850                                     ISC24010
      IKSW = 1                                                          ISC24020
      JJ = 0                                                            ISC24030
 1790 JJ = JJ+1                                                         ISC24040
      IF (JJ .GT. NYPNTS) GO TO 1850                                    ISC24050
      JJJ = (JJ-1)*NXPNTS                                               ISC24060
      IF (ISW(2) .GT. 1) GO TO 1800                                     ISC24070
      YP = Y(JJ)-DYP                                                    ISC24080
      GO TO 1810                                                        ISC24090
 1800 YC = Y(JJ)*RADIAN                                                 ISC24100
      YS = SIN(YC)                                                      ISC24110
      YC = COS(YC)                                                      ISC24120
 1810 CONTINUE                                                          ISC24130
C                                                                       ISC24140
C     LOOP OVER X GRID COORDINATES                                      ISC24150
C*****************************************************************    ISC24160
      II = 0                                                            ISC24170
 1820 II = II+1                                                         ISC24180
      IF (II .GT. NXPNTS) GO TO 1790                                    ISC24190
      IF (ISW(2) .GT. 1) GO TO 1830                                     ISC24200
      XP = X(II)-DXP                                                    ISC24210
      GO TO 1840                                                        ISC24220
 1830 YP = X(II)*YC-DYP                                                 ISC24230
      XP = X(II)*YS-DXP                                                 ISC24240
 1840 IJ = JJJ+II                                                       ISC24250
      GO TO 1900                                                        ISC24260
C                                                                       ISC24270
C     LOOP OVER SPECIAL CALCULATION POINTS (RECEPTORS)                  ISC24280
C*****************************************************************    ISC24290
 1850 IKSW = 2                                                          ISC24300
      IF (NXWYPT .LE. 0) GO TO 2230                                     ISC24310
      IJ = NXXYY                                                        ISC24320
 1860 IJ = IJ+1                                                         ISC24330
      IF (IJ .GT. NXXYYP) GO TO 2230                                    ISC24340
      JJ = IJ+NYPSS                                                     ISC24350
      II = IJ+NXPSS                                                     ISC24360
      IF (ISW(12) .NE. 1) GO TO 1880                                    ISC24370
      IF (X(II)) 1880,1870,1880                                         ISC24380
 1870 IF (Y(JJ)) 1880,1860,1880                                         ISC24390
 1880 CONTINUE                                                          ISC24400
      IF (ISW(3) .GT. 1) GO TO 1890                                     ISC24410
      YP = Y(JJ)-DYP                                                    ISC24420
      XP = X(II)-DXP                                                    ISC24430
      GO TO 1900                                                        ISC24440
 1890 YC = Y(JJ)*RADIAN                                                 ISC24450
      YS = SIN(YC)                                                      ISC24460
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      YC = COS(YC)                                                      ISC24470
      YP = X(II)*YC-DYP                                                 ISC24480
      XP = X(II)*YS-DXP                                                 ISC24490
 1900 CONTINUE                                                          ISC24500
      DO 1910 K=1,NSEASN                                                ISC24510
      L1 = (K+L91)*NXXYYP+L9                                            ISC24520
 1910 CON(L1+IJ) = 0.0                                                  ISC24530
      ZP = 0.0                                                          ISC24540
      IF (ISW(4) .NE. 0) ZP = Z(IJ)                                     ISC24550
C     ALLOW TREATMENT OF RECEPTORS WITH ELEVATIONS BELOW                ISC24560
C     PLANT GRADE IN THE SAME MANNER AS ABOVE PLANT GRADE.              ISC24570
      IF(TYPE.EQ.2) ZP=ZS                                               ISC24580
      IF (TYPE .EQ. 2.OR.ZP .LE. H+ZS) GO TO 1920                       ISC24590
C     CODE MODIFIED BY TRC TO ALLOW FOR TERRAIN                         ISC24600
C     TRUNCATION WHEN RECEPTOR ELEVATION IS ABOVE                       ISC24610
C     SOURCE ELEVATION PLUS SOURCE HEIGHT.                              ISC24620
      ZP=ZS+H-.005                                                      ISC24630
 1920 CONTINUE                                                          ISC24640
      ZSMZP = ZS-ZP                                                     ISC24650
C     SEE IF SOURCE AND POINT ARE TOO CLOSE                             ISC24660
      RD = SQRT(XP*XP+YP*YP)                                            ISC24670
C     PERFORM SOURCE - POINT DISTANCE COMPARISON FOR ORIGINAL DOWNWASH   ISC24680
      IF (KTYPE .EQ. 1) GOTO 1922                                       ISC24690
      IF (RD .GE. XMX) GO TO 1922                                       ISC24700
      N = 3                                                             ISC24710
      IF (ISW(6) .GE. 2) N = 1                                          ISC24720
      CALL TITLR(1,N,0)                                                 ISC24730
      WRITE (JUNT,9025)'NUMS,X(II),Y(JJ)                                ISC24740
      GO TO 2220                                                        ISC24750
 1922 CONTINUE                                                          ISC24760
      JN = 0                                                            ISC24770
C                                                                       ISC24780
C     LOOP OVER WIND DIRECTION SECTORS (CATEGORIES)                     ISC24790
C*************************************************************************ISC24800
      DO 2210 N=1,NSCTOR                                                ISC24810
C     SET DIMENSION VARIABLE FOR EITHER REGULAR OR DIRECTION SPECIFIC   ISC24820
C     BUILDING DOWNWASH TREATMENT                                       ISC24830
      L = 1                                                             ISC24840
      IF (KTYPE .EQ. 0) GOTO 1944                                       ISC24850
      L = N                                                             ISC24860
C     DO BUILDING WAKE EFFECTS COEFFICIENTS ADJUSTMENTS BASED ON        ISC24870
C     WIND SECTORS                                                      ISC24880
      IF (DSNSW1(N) .EQ. 0) DSJTYP(N)= 0                                ISC24890
      IF (DSNSW1(N) .EQ. 1.AND.DSNSW2(N) .EQ. 0) DSNSW2(N) = -1         ISC24900
      NSW1 = DSNSW1(N)                                                  ISC24910
      NSW2 = DSNSW2(N)                                                  ISC24920
      XMX = 0.0                                                         ISC24930
      IF (DSJTYP(N) .EQ. 0) GO TO 1944                                  ISC24940
C     WAKE EFFECTS COEFFICIENTS TO CALC SIGZ AND XY                     ISC24950
C     FOR DISTANCES LESS THAN 10HB (SQUAT) OR 10HW (TALL)               ISC24960
      HWOHB = DSHW(N)/DSBH(N)                                           ISC24970
      C6 = DSHW(N)                                                      ISC24980
      IF (DSJTYP(N) .EQ. 1) C6 = DSBH(N)                                ISC24990
C     DETERMINE MINIMUM CALCULATION DISTANCE FOR DIRECTION SPECIFIC     ISC25000
      XMX = 3.0*C6                                                      ISC25010
      XMX = AMAX1(XMX,1.)                                               ISC25020
      IF (RD .LT. XMX) THEN                                             ISC25030
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C     SET FLAG AND COUNTER TO WRITE SOURCE-RECEPTOR DISTANCE MESSAGE     ISC25040
      JN = JN + 1                                                        ISC25050
      DSRDCK(JN) = N                                                     ISC25060
      GOTO 2210                                                          ISC25070
      ENDIF                                                              ISC25080
C     COEFFICIENTS FOR SIGZ ( SIGZ = B1+B2*X )                           ISC25090
      B1 = 0.499*C6                                                      ISC25100
C     COEFFICIENTS FOR XY ( XY = 2.15*SIGYO/COT(.5*DELTA THETA) )        ISC25110
C          (WHERE  SIGYO = B3+B2*X )                                     ISC25120
      IF (DSJTYP(N) .EQ. 2) GO TO 1930                                   ISC25130
      IF (HWOHB .GT. 5) GO TO 1924                                       ISC25140
      B3 = 0.35*DSHW(N)-0.201*DSBH(N)                                    ISC25150
      GO TO 1932                                                         ISC25160
 1924 IF (IWAKSW(N) .EQ. 1) GO TO 1928                                   ISC25170
      B3 = 0.49*DSBH(N)                                                  ISC25180
      GO TO 1932                                                         ISC25190
 1928 B3 = 1.549*DSBH(N)                                                 ISC25200
      GO TO 1932                                                         ISC25210
 1930 B3 = 0.149*DSHW(N)                                                 ISC25220
 1932 CONTINUE                                                           ISC25230
C     FOR DISTANCES GREATER THAN OR EQUAL TO 10HB (SQUAT) OR 10HW (TALL)ISC25240
      SIGZOP = 1.2*C6                                                    ISC25250
      C7 = 10.0*C6                                                       ISC25260
      HB10 = C7                                                          ISC25270
      DO 1942 I=1,NSTBLE                                                 ISC25280
C     XZ IS DEPENDENT ON DISTANCE AND IS CALCULATED BELOW IN MAIN MODEL  ISC25 90
C     CALCULATIONS                                                       ISC25300
C     CALC XY FOR DIRECTION SPECIFIC BUILDING DIMENSIONS                 ISC25310
      IF (DSJTYP(N) .EQ. 2) GO TO 1938                                   ISC25320
      IF (HWOHB .GT. 5.0) GO TO 1934                                     ISC25330
      C5 = 0.35*DSHW(N)+0.5*DSBH(N)                                      ISC25340
      GO TO 1940                                                         ISC25350
 1934 IF (IWAKSW(N) .EQ. 1) GO TO 1936                                   ISC25360
      C5 = 0.85*DSBH(N)                                                  ISC25370
      GO TO 1940                                                         ISC25380
 1936 C5 = 2.25*DSBH(N)                                                  ISC25390
      GO TO 1940                                                         ISC25400
 1938 C5 = 0.85*DSHW(N)                                                  ISC25410
 1940 CONTINUE                                                           ISC25420
      IF(ISW(9) .NE. 4) XY(I,N)=VIRTY(C5*2.15,ISTBLE(I))-C7              ISC25430
      IF (ISW(9) .EQ. 4) XY(I,N)=XVY(C5*2.15,ISTBLE(I))-C7               ISC25440
      IF (XY(I,N) .LT. 0.0) XY(I,N) = 0.0                                ISC25450
 1942 CONTINUE                                                           ISC25460
C     FIND MIN OF DIRECTION SPECIFIC HEIGHT AND WIDTH FOR THIS SECTOR    ISC25470
      ZLB=AMIN1(DSBH(N),DSHW(N))                                         ISC25480
C     CHANGE DOWNWASH TO INCLUDE LINEAR DECAY TERM                       ISC25490
      IF (DSHP(N) .LE. DSBH(N)) THEN                                     ISC25500
C     LINEAR DECAY FACTOR (A); PLUME BELOW TOP OF BUILDING               ISC25510
      A = 1.0                                                            ISC25520
C     PLUME BELOW H + 2L                                                 ISC25530
      ELSE IF (DSHP(N) .LE. DSBH(N)+2.*ZLB) THEN                         ISC25540
      A = (DSBH(N)-DSHP(N))/(2.*ZLB)+1.0                                 ISC25550
C     PLUME ABOVE H + 2L                                                 ISC25560
      ELSE                                                               ISC25570
      A = 0.0                                                            ISC25580
      ENDIF                                                              ISC25590
C     SET JTYPE FOR USE IN REST OF WIND DIRECTION LOOP                   ISC25600
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 1944 IF (KTYPE .EQ. 1) JTYPE=DSJTYP(N)                                 ISC25610
C     CALC DOWNWIND AND CROSSWIND DISTANCES FROM SOURCE TO RECEPTOR     ISC25620
      XB = -XP*PHS(N)-YP*PHC(N)                                         ISC25630
      YB = XP*PHC(N)-YP*PHS(N)                                          ISC25640
C     IF POINT UPWIND OF SOURCE NO CALC                                 ISC25650
      IF (XB .LE. 0.0) GO TO 2210                                       ISC25660
      IF (TYPE .EQ. 1) GO TO 1950                                       ISC25670
      IF (TYPE .EQ. 2) GO TO 1946                                       ISC25680
C     STACK EMISSIONS                                                   ISC25690
      IF (JTYPE .EQ. 0) GO TO 1946                                      ISC25700
C     PRECALC WAKE EFFECTS IF XB < HB10                                 ISC25710
      IF (XB .GE. HB10) GO TO 1950                                      ISC25720
      SIGZ1 = B1+XB*B2                                                  ISC25730
      XYP1 = XYPU*(B3+XB*B2)                                            ISC25740
      SIGIP1 = 1.0/SIGZ1                                                ISC25750
      SIGZI1 = -0.5*SIGIP1*SIGIP1                                       ISC25760
      GO TO 1950                                                        ISC25770
C     AREA SOURCES AND STACKS WITHOUT WAKE EFFECTS                      ISC25780
 1946 C2 = C1                                                           ISC25790
      XYP = XY(1,1)                                                     ISC25800
C     CALC DIST AND SMOOTHING TERM FOR AREA SOURCES AND STACKS WITH     ISC25810
C     NO WAKE EFFECTS                                                   ISC25820
      CALL DISTR                                                        ISC25830
      IF (ARG .LT. 0.0) GO TO 2210                                      ISC25840
      C3 = C2*ARG                                                       ISC25850
      IF (ISW(1) .EQ. 2) C3 = C3*RPI                                    ISC25860
 1950 CONTINUE                                                          ISC25870
C                                                                       ISC25880
C     BEGIN LOOP OVER STABILITY FOR MAIN MODEL CALCULATIONS             ISC25890
C*************************************************************************ISC25900
      DO 2200 I=1,NSTBLE                                                ISC25910
      IF (KTYPE .EQ. 1) THEN                                            ISC25920
C     COMPUTE R0, YL TO BE USED IN BLP PLUME RISE EQUATIONS             ISC25930
      R0 = 0.0                                                          ISC25940
      YL = 0.0                                                          ISC25950
C     DOWNWASH IF A > 0.                                                ISC25960
      IF (A .GT. 0.0) THEN                                              ISC25970
      R0 = 0.98995 * A * ZLB                                            ISC25980
C     CHECK THAT NORMAL SIGMA-Z IS NOT GREATER THAN DOWNWASH SIGMA-Z    ISC25990
      A3 = 3.*ZLB                                                       ISC26000
      IF (ISW(9) .EQ. 4) THEN                                           ISC26010
      CALL URBNYZ(A3,ISTBLE(I),DUMMY,A2)                                ISC26020
C        1.41421 = SQRT(2)                                              ISC26030
      R0 =AMAX1(R0,(1.41421*A*A2))                                      ISC26040
      ELSE                                                              ISC26050
C     GET SIGMA-Z AT 3*ZLB                                              ISC26060
      A2 = SIGMAZ(A3,ISTBLE(I))                                         ISC26070
      R0 =AMAX1(R0,(1.41421*A*A2))                                      ISC26080
      ENDIF                                                             ISC26090
      ENDIF                                                             ISC26100
C     ENHANCE SIGMA-Y                                                   ISC26110
      IF (DSHP(L) .LE. DSHB12(L)) THEN                                  ISC26120
      SYL = .35*ZLB-A2                                                  ISC26130
      SYL = AMAX1(SYL,0.0)                                              ISC26140
      IF (HWOHB .LE. 5.0) THEN                                          ISC26150
C         2.5066 = SQRT(2PI)                                            ISC26160
      YL = 2.5066 * SYL                                                 ISC26170
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      ELSE IF (IWAKSW(L) .EQ. 1) THEN                                   ISC26180
C     EDGE EFFECTS OCCUR (SIGMA-Y = 1.75*SQRT(2PI)*DSBH(L))             ISC26190
      YL = 12.533 * SYL                                                 ISC26200
      ELSE                                                              ISC26210
C     SIGMA-Y = 0.35*SQRT(2PI)*DSBH(L)                                  ISC26220
      YL = 2.5066 * SYL                                                 ISC26230
      ENDIF                                                             ISC26240
C     CHECK THAT SIGMA-Y FROM CURVES IS NOT GREATER THAN SIGMA-Y        ISC26250
C     FROM BUILDING                                                     ISC26260
      TR2 = A3 * TAN(0.5*TR) * 2.0                                      ISC26270
      YL = AMAX1(YL,TR2)                                                ISC26280
      ENDIF                                                             ISC26290
      ENDIF                                                             ISC26300
      KK = 4*(I-1)                                                      ISC26310
      IF (TYPE .NE. 1) GO TO 1960                                       ISC26320
      XYP = XY(I,L)                                                     ISC26330
C     CALC DIST AND SMOOTHING TERM FOR VOLUME SOURCES                   ISC26340
      CALL DISTR                                                        ISC26350
      IF (ARG .LT. 0.0) GO TO 2200                                      ISC26360
      C3 = C1*ARG                                                       ISC26370
      IF (ISW(1) .EQ. 2) C3 = C3*RPI                                    ISC26380
 1960 CONTINUE                                                          ISC26390
C     CALC SIGZ FOR VOLUME, AREA AND STACKS WITHOUT WAKE EFFECTS        ISC26400
      IF (TYPE .NE. 0.OR.JTYPE.EQ. 0.OR.XB .GE. HB10) GO TO 1970        ISC26410
      XZ = 0.0                                                          ISC26420
      GO TO 1990                                                        ISC26430
 1970 CONTINUE                                                          ISC26440
      IF (NSW2 .LT. 0) GO TO 2000                                       ISC26450
      XZ = 0.0                                                          ISC26460
      IF (TYPE .EQ. 0) GO TO 1990                                       ISC26470
      IF (TYPE .EQ. 2) GO TO 1980                                       ISC26480
      IF(ISW(9) .NE. 4) XZ=VIRTZ(SIGZOP,ISTBLE(I),XB,0.0)               ISC26490
      IF(ISW(9) .EQ. 4) XZ=XVZ(SIGZOP,ISTBLE(I))                        ISC26500
      GO TO 1990                                                        ISC26510
 1980 XZ = BW                                                           ISC26520
 1990 CONTINUE                                                          ISC26530
      IF(ISW(9) .NE. 4) SIGZ=SIGMAZ(XB+XZ,ISTBLE(I))                    ISC26540
      IF(ISW(9) .EQ. 4) CALL URBNYZ(XB+XZ,ISTBLE(I),DUMSY,SIGZ)         ISC26550
      SIGZIP = 1.0/SIGZ                                                 ISC26560
      SIGZI = -0.5*SIGZIP*SIGZIP                                        ISC26570
      IF (TYPE .GT. 0.OR.JTYPE .EQ. 0) GO TO 2010                       ISC26580
      SIGZ2 = SIGZ                                                      ISC26590
      SIGIP2 = SIGZIP                                                   ISC26600
      SIGZI2 = SIGZI                                                    ISC26610
 2000 IF (XB .LT. HB10) GO TO 2010                                      ISC26620
C     WAKE EFFECTS MODIFICATIONS FOR DIST. GREATER THAN OR EQUAL TO 10HBISC26630
      IF(ISW(9) .NE. 4) GOTO 2005                                       ISC26640
      XZ=XVZ(SIGZOP,ISTBLE(I))                                          ISC26650
      CALL URBNYZ(XB+XZ,ISTBLE(I),DUMSY,SIGZ1)                          ISC26660
      GOTO 2007                                                         ISC26670
 2005 XZ=VIRTZ(SIGZOP,ISTBLE(I),XB,HB10)                                ISC26680
      SIGZ1 = SIGMAZ(XB+XZ,ISTBLE(I))                                   ISC26690
 2007 CONTINUE                                                          ISC26700
      XYP1 = XY(I,L)                                                    ISC26710
      SIGIP1 = 1.0/SIGZ1                                                ISC26720
      SIGZI1 = -0.5*SIGIP1*SIGIP1                                       ISC26730
 2010 CONTINUE                                                          ISC26740
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      IF (ISW(1) .EQ. 2) BBAR=FUNCT(XB,ISTBLE(I),ISW(9))                ISC26750
C     DEFINE OLD SIGZ FOR BID CALCULATION                               ISC26760
      IF(TYPE.EQ.0) SZOLD=SIGZ                                          ISC26770
C                                                                       ISC26780
C     BEGIN LOOP OVER SEASONS FOR MAIN MODEL CALCULATIONS               ISC26790
C*************************************************************************ISC26800
      DO 2190 K=1,NSEASN                                                ISC26810
      M = 4*(K-1)                                                       ISC26820
      KN = KK+K                                                         ISC26830
      L1 = (K+L91)*NOXYYP+L9                                            ISC26840
C                                                                       ISC26850
C     BEGIN LOOP OVER WIND SPEED FOR MAIN MODEL CALCULATIONS            ISC26860
C*************************************************************************ISC26870
      DO 2180 J=1,NSPEED                                                ISC26880
      C4 = 0.0                                                          ISC26890
C     ADD BLP FINAL BUOYANT PLUME RISE IF SCHULMAN-SCIRE DOWNWASH       ISC26900
C     FM IS PASSED AS 0.0 FOR BUOYANT RISE ONLY                         ISC26910
      IF (KTYPE .EQ. 1) THEN                                            ISC26920
      CALL BLPLT(RO,YL,I,F,0.0,DMAX,UBH,S,BETAJI,DELH(J,I,L,M+1))       ISC26930
      ENDIF                                                             ISC26940
      IF (FREQ(J,N,KN) .LE. 0.0) GO TO 2180                             ISC26950
      HP = H                                                            ISC26960
      IF (TYPE .GT. 0) GO TO 2090                                       ISC26970
C     SET SIGZ = OLD SIGZ FOR BID CALCULATION                           ISC26980
      SIGZ=SZOLD                                                        ISC26990
      IF (JTYPE .EQ. 0) GO TO 2060                                      ISC27000
C     STACK EMISSIONS WITH WAKE EFFECTS                                 ISC27010
      IF (DELH(J,I,L,M+3) .GE. 0.0) GO TO 2040                          ISC27020
C     USE MODIFIED SIGZ                                                 ISC27030
      IF (XB .GE. HB10) GO TO 2020                                      ISC27040
      IF (SIGZ1 .GE. SIGZ2) GO TO 2020                                  ISC27050
      SIGZ = SIGZ2                                                      ISC27060
      SIGZIP = SIGIP2                                                   ISC27070
      SIGZI = SIGZI2                                                    ISC27080
      GO TO 2030                                                        ISC27090
 2020 CONTINUE                                                          ISC27100
      SIGZ = SIGZ1                                                      ISC27110
      SIGZIP = SIGIP1                                                   ISC27120
      SIGZI = SIGZI1                                                    ISC27130
 2030 XYP = 0.0                                                         ISC27140
      IF (DELH(J,I,L,M+4) .GE. 0.0) GO TO 2050                          ISC27150
C     USE MODIFIED XY                                                   ISC27160
      XYP = XYP1                                                        ISC27170
      GO TO 2050                                                        ISC27180
C     UNMODIFIED SIGZ AND XY                                            ISC27190
 2040 SIGZ = SIGZ2                                                      ISC27200
      XYP = 0.0                                                         ISC27210
      SIGZIP = SIGIP2                                                   ISC27220
      SIGZI = SIGZI2                                                    ISC27230
 2050 CONTINUE                                                          ISC27240
C     CALC DIST AND SMOOTHING TERM FOR STACKS WITH WAKE EFFECTS         ISC27250
      CALL DISTR                                                        ISC27260
      IF (ARG .LE. 0.0) GO TO 2180                                      ISC27270
      C3 = C1*ARG                                                       ISC27280
      IF (ISW(1) .EQ. 2) C3 = C3*PPI                                    ISC27290
C     CALCULATE TRANSITIONAL PLUME RISE                                 ISC27300
 2060 C7 = XB                                                           ISC27310
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      C7A=XB                                                            ISC27320
      XKM=C7*.001                                                       ISC27330
C     HSAV IS MPTER FINAL PLUME RISE                                    ISC27340
      HSAV=DELH(J,I,L,M+1)                                              ISC27350
      IF (KTYPE .EQ. 0) THEN                                            ISC27360
      IF(XKM.GT.DELH(J,I,L,M+2).AND.DELH(J,I,L,M+3).GT.0..AND.          ISC27370
     X  DELH(J,I,L,M+4).GT.0.) GO TO 2070                               ISC27380
      IF(ISW(19).EQ.0.AND.ISW(21).NE.0.AND.DELH(J,I,L,M+3).GT.0.        ISC27390
     X  .AND.DELH(J,I,L,M+4).GT.0.) GO TO 2070                          ISC27400
      ENDIF                                                             ISC27410
      F=G*VEL*D*D*.25*(1.-TA(I,K)/T)                                    ISC27420
      IF(F.LT.0.0) F=0.0                                                ISC27430
C     CALCULATE MPTER TRANSITIONAL PLUME RISE                           ISC27440
      HP=160.*F**.333333*XKM**.666667/UBHI(J,I)                         ISC27450
      IF(HP.GT.HSAV) HP=HSAV                                            ISC27460
      HSAV=HP                                                           ISC27470
      C9A=G*DPDZ(J,I)                                                   ISC27480
      UBHA=1./UBHI(J,I)                                                 ISC27490
      BETAJ=1./3.+UBHA*VELI                                             ISC27500
      BETAJ=BETAJ*BETAJ                                                 ISC27510
      BETAJI=1./BETAJ                                                   ISC27520
      FM=TA(I,K)/T*VEL*VEL*D*D*.25                                      ISC27530
C     IF BUILDING WAKE EFFECTS USED, CALCULATE UNAMAP 5                 ISC27540
C     ISC DISTANCE DEPENDENT MOMENTUM RISE                              ISC27550
      IF(DELH(J,I,L,M+3).LE.0..OR.DELH(J,I,L,M+4).LE.0.) THEN           ISC27560
      IF (KTYPE .EQ. 0) THEN                                            ISC27570
      IF(C9A.GT.0.0) GO TO 2062                                         ISC27580
C     UNSTABLE CONDITIONS                                               ISC27590
C     CALCULATE MAX DOWNWIND DISTANCE                                   ISC27600
      IF(F.LE.0.) THEN                                                  ISC27610
      DMAX=4.*D*VEL*UBHI(J,I)*(VEL+3.*UBHA)**2                          ISC27620
      ELSE                                                              ISC27630
      XSTAR=34.*F**.4                                                   ISC27640
      IF(F.LE.55.) XSTAR=14.*F**.625                                    ISC27650
      DMAX=3.5*XSTAR                                                    ISC27660
      ENDIF                                                             ISC27670
      IF(C7A.GT.DMAX) C7A=DMAX                                          ISC27680
      HP=3.*FM*C7A*BETAJI*UBHI(J,I)*UBHI(J,I)                           ISC27690
      HP=HP**.33333333                                                  ISC27700
      GO TO 2064                                                        ISC27710
C     STABLE CONDITIONS                                                 ISC27720
 2062 S=C9A/TA(I,K)                                                     ISC27730
      SSQ=SQRT(S)                                                       ISC27740
      SSQI=1./SSQ                                                       ISC27750
C      CALCULATE MAX DOWNWIND DISTANCE                                  ISC27760
      DMAX=3.1415926*UBHA*SSQI                                          ISC27770
      IF(F.EQ.0.) DMAX=DMAX*.5                                          ISC27780
      IF(C7A.GT.DMAX) C7A=DMAX                                          ISC27790
      HP=AMAX1(1.E-10,3.*FM*BETAJI*UBHI(J,I)*SSQI*SIN(SSQ*C7A           ISC27800
     &          *UBHI(J,I)))                                           ISC27810
      HP=HP**.33333333                                                  ISC27820
C     HP1 IS MAX ISC MOMENTUM RISE                                      ISC27830
 2064 HP1=3.*VEL*D*UBHI(J,I)                                            ISC27840
      IF(HP.GT.HP1) HP=HP1                                              ISC27850
C     USE LARGER OF ISC MOMENTUM RISE OR MPTER                          ISC27860
C     TRANSITIONAL RISE                                                 ISC27870
      IF(HSAV.LT.HP) HSAV=HP                                            ISC27880
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      ELSE                                                                  ISC27890
C     LIMIT DISTANCE TO MAX RISE                                            ISC27900
      XSR = XB                                                              ISC27910
      IF (XSR .GT. DMAX) XSR = DMAX                                         ISC27920
C     COMPUTE TRANSITIONAL RISE (BLP NEUTRAL, BUOYANT RISE)                 ISC27930
      CALL BLPRIZ(4,F,0.0,XSR,UBH,S,BETAJI,HP)                              ISC27940
C     DISTANCE TO MAX NEUTRAL MOMENTUM RISE                                 ISC27950
      XPRN = 4.*D*UBHI(J,I)/VEL*(VEL+3.*UBH)**2                             ISC27960
C     LIMIT DISTANCE TO UNSTABLE/NEUTRAL MOMENTUM RISE                      ISC27970
      IF (C9A .LE. 0.0) THEN                                                ISC27980
      XSP = AMIN1(XB,XPRN)                                                  ISC27990
      CALL BLPRIZ(1,0.0,FM,XSR,UBH,S,BETAJI,HP1)                            ISC28000
      ELSE                                                                  ISC28010
C     DISTANCE TO MAX STABLE MOMENTUM RISE                                  ISC28020
C        1.5707963 = PI/2                                                   ISC28030
      S=C9A/TA(I,K)                                                         ISC28040
      SSQ=SQRT(S)                                                           ISC28050
      SSQI=1./SSQ                                                           ISC28060
      XPRS = 1.5707963 * UBH * SSQI                                         ISC28070
      XSR = AMIN1(XB,XPRS)                                                  ISC28080
      CALL BLPRIZ(1,0.0,FM,XPRN,UBH,S,BETAJI,HP1)                           ISC28090
C     COMPUTE THE MAX NEUTRAL MOMENTUM RISE                                 ISC28100
      CALL BLPRIZ(4,0.0,FM,XPRN,UBH,S,BETAJI,HP2)                           ISC28110
C     FIND THE MINIMUM OF MOMENTUM RISE                                     ISC28120
      HP1 = AMIN1(HP1,HP2)                                                  ISC28130
      ENDIF                                                                 ISC28140
C     CHOOSE MAXIMUM OF TRANSITIONAL OR MOMENTUM PLUME RISE                 ISC28150
      HP = AMAX1(HP,HP1)                                                    ISC28160
      ENDIF                                                                 ISC28170
      ENDIF                                                                 ISC28180
      IF (KTYPE .EQ. 1) GOTO 2090                                           ISC28190
      IF(ISW(19).EQ.0.AND.DELH(J,I,L,M+3).GT.0.                             ISC28200
     X  .AND.DELH(J,I,L,M+4).GT.0.) GO TO 2070                              ISC28210
      HP=HSAV+HBRIG(J,I)                                                    ISC28220
      GO TO 2090                                                            ISC28230
 2070 HP=DELH(J,I,L,M+1)+HBRIG(J,I)                                         ISC28240
 2090 CONTINUE                                                              ISC28250
      IF(TYPE.GT.0) GO TO 2095                                              ISC28260
C     SKIP B.I.D. CALC. IF DIRECTION SPECIFIC BUILDING DOWNWASH IS USED     ISC28270
      IF(ISW(21).NE.0 .OR. KTYPE .EQ. 1) GO TO 2095                         ISC28280
      DUM=HSAV/3.5                                                          ISC28290
      DUM=DUM*DUM                                                           ISC28300
      SIGZ=SQRT(SIGZ*SIGZ+DUM)                                              ISC28310
      SIGZIP=1/SIGZ                                                         ISC28320
      SIGZI=-.5*SIGZIP*SIGZIP                                               ISC28330
 2095 CONTINUE                                                              ISC28340
C     ADJUST PLUME FOR ELEVATION                                            ISC28350
      HP = HP+ZSMZP                                                         ISC28360
C     IF PLUME OUT OF MIXING LAYER NO CALC.                                 ISC28370
C     CHECK FOR PLUME HEIGHT GREATER THAN MIXING HEIGHT                     ISC28380
C     AT SOURCE.                                                            ISC28390
      IF((HP-ZSMZP).GT.HM(J,I,K)) GO TO 2130                                ISC28400
      HMP = HM(J,I,K)                                                       ISC28410
      C4 = C3*Q(J,I,K)*FREQ(J,N,KN)*SIGZIP                                  ISC28420
      IF (ISW(1) .LE. 1) C4 = C4*UBHI(J,I)                                  ISC28430
C     DEPLETION DUE TO TIME DEPENDENT DECAY                                 ISC28440
      IF (DECAY .LE. 0.0) GO TO 2100                                        ISC28450
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      C7 = RP                                                          ISC28460
      IF (TYPE .EQ. 2) C7 = RP-R0                                      ISC28470
      C4 = C4*EXP(-DECAY*C7*UBHI(J,I))                                 ISC28480
 2100 CONTINUE                                                         ISC28490
C     RHTAG IS RECEPTOR HEIGHT ABOVE GROUND (FLAGPOLE RECEPTOR)        ISC28500
      IF (ISW(25) .EQ. 1) THEN                                         ISC28510
      RHTAG = RHT(IJ)                                                  ISC28520
      ENDIF                                                            ISC28530
C     CALC VERTICAL TERM                                               ISC28540
      IF (ISW(1) .EQ. 2) GO TO 2140                                    ISC28550
      IF (NVS .GT. 0) GO TO 2110                                       ISC28560
C     CONCENTRATION ONLY                                               ISC28570
      IF (ISW(25) .EQ. 0 .OR. RHTAG .LT. 0.00001) THEN                 ISC28580
      CALL VERTC1                                                      ISC28590
      ELSE                                                             ISC28600
      CALL VRTC1R(RHTAG)                                               ISC28610
      ENDIF                                                            ISC28620
      GO TO 2160                                                       ISC28630
 2110 CONTINUE                                                         ISC28640
      C7 = RP*UBHI(J,I)                                                ISC28650
      VV = 0.0                                                         ISC28660
      IF (ISW(25) .EQ. 1) THEN                                         ISC28670
      RHTAG = RHT(IJ)                                                  ISC28680
      ELSE                                                             ISC28690
      RHTAG = 0.0                                                      ISC28700
      ENDIF                                                            ISC28710
      DO 2120 IL=1,NVS                                                 ISC28720
      VSROU = C7*VS(IL)                                                ISC28730
C     CONCENTRATION WITH DEPLETION DUE TO GRAVITATIONAL DEPOSITION     ISC28740
      CALL VERTC2(GAMMA(IL),RHTAG)                                     ISC28750
      VV = VV+V*FRQ(IL)                                                ISC28760
 2120 CONTINUE                                                         ISC28770
 2130 V = VV                                                           ISC28780
      GO TO 2160                                                       ISC28790
 2140 CONTINUE                                                         ISC28800
      VV = 0.0                                                         ISC28810
      C7 = RP*UBHI(J,I)                                                ISC28820
      DO 2150 IL=1,NVS                                                 ISC28830
      VSROU = C7*VS(IL)                                                ISC28840
C     GRAVITATIONAL DEPOSITION                                         ISC28850
      CALL VERTC3(GAMMA(IL))                                           ISC28860
      VV = VV+(1.0-GAMMA(IL))*FRQ(IL)*V                                ISC28870
 2150 CONTINUE                                                         ISC28880
      GO TO 2130                                                       ISC28890
 2160 CONTINUE                                                         ISC28900
      C4 = C4*V                                                        ISC28910
C                                                                      ISC28920
C     ACCUMULATE CONCENTRATION OR DEPOSITION                           ISC28930
      CON(L1+IJ) = CON(L1+IJ)+C4                                       ISC28940
C                                                                      ISC28950
C     END LOOP OVER WIND SPEED                                         ISC28960
 2170 CONTINUE                                                         ISC28970
 2180 CONTINUE                                                         ISC28980
C*****************************************************************   ISC28990
C                                                                      ISC29000
C     END LOOP OVER SEASONS                                            ISC29010
 2190 CONTINUE                                                         ISC29020
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C*********************************************************************ISC29030
C                                                                      ISC29040
C     END LOOP OVER STABILITY                                          ISC29050
 2200 CONTINUE                                                         ISC29060
C*********************************************************************ISC29070
C                                                                      ISC29080
C     END LOOP OVER WIND DIRECTION SECTORS                             ISC29090
 2210 CONTINUE                                                         ISC29100
C*********************************************************************ISC29110
      IF (KTYPE .EQ. 1 .AND. JN .GT. 0) THEN                           ISC29120
C     WRITE ERROR MESSAGE ABOUT SOURCE - RECEPTOR DISTANCE             ISC29130
      LL=3                                                             ISC29140
      IF (ISW(6) .GE. 2) LL=1                                          ISC29150
      CALL TITLR(2,LL,0)                                               ISC29160
      WRITE(JUNT,9047) NUMS,X(II),Y(JJ),(DSRDCK(N),N=1,JN)             ISC29170
      ENDIF                                                            ISC29180
C                                                                      ISC29190
C     END LOOP OVER X,Y AXIS POINTS AND SPECIAL RECEPTOR POINTS        ISC29200
 2220 CONTINUE                                                         ISC29210
      GO TO (1820,1860),IKSW                                           ISC29220
C*********************************************************************ISC29230
 2230 CONTINUE                                                         ISC29240
C                                                                      ISC29250
C     START SECTION TO OUTPUT INDIVIDUAL SOURCES AND ACCUMULATE FOR THE ISC29260
C     TOTAL SUM OF SOURCES.                                            ISC29270
C                                                                      ISC29280
C     IS TAPE OUTPUT DESIRED                                           ISC29290
 2240 IF (ISW(5) .EQ. 0.OR.ISW(5) .EQ. 2) GO TO 2260                   ISC29300
C     OUTPUT SOURCE RECORD                                             ISC29310
      WRITE (NUNT) (NSOR(I),I=1,NSO)                                   ISC29320
      NT = NT+1                                                        ISC29330
      ITSAVE(NT) = NUMS*10+TYPE                                        ISC29340
      IF (NT .GE. NTT) CALL OUTPT(-4,NT,X,Y,Z,NTT)                     ISC29350
C     OUTPUT CONCENTRATION (DEPOSITION) RECORD(S)                      ISC29360
      DO 2250 K=1,NSEASN                                               ISC29370
      L1 = (K+L91)*NXXYYP+L9                                           ISC29380
      WRITE (NUNT) (CON(L1+I),I=1,NXXYYP)                              ISC29390
 2250 CONTINUE                                                         ISC29400
 2260 CONTINUE                                                         ISC29410
C     IF SOURCE PART OF THIS COMBINED SOURCE GROUP USE IT              ISC29420
      IF (NOCOMB(NG) .EQ. 0) GO TO 2270                                ISC29430
      CALL CHECKR(0,J)                                                 ISC29440
      IF (J .NE. 0) GO TO 2270                                         ISC29450
C     J = 0 IS NOT PART OF COMBINED, = 1 YES PART OF COMBINED          ISC29460
      GO TO 2380                                                       ISC29470
 2270 CONTINUE                                                         ISC29480
C                                                                      ISC29490
C     ACCUMULATE TOTAL CONCENTRATION (DEPOSITION) OVER SELECTED SOURCES ISC29500
C     AND PRINT IF DESIRED                                             ISC29510
      NT4 = 1                                                          ISC29520
      KK = 1                                                           ISC29530
      DO 2320 K=1,NSEASN                                               ISC29540
      L1 = (K+L91)*NXXYYP+L9                                           ISC29550
      IF (ISW(11) .EQ. 2) GO TO 2290                                   ISC29560
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 2) GO TO 2280                   ISC29570
C     PRINT INDIVIDUAL SOURCES - SEASONAL                              ISC29580
      CALL OUTPT(KK,K,X,Y,CON(L1+1),1)                                 ISC29590
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 2280 IF (ISW(8) .EQ. 1.AND.ISW11 .NE. 2) GO TO 2300                    ISC29600
C     ACCUMULATE FOR SUM OF SOURCES                                     ISC29610
 2290 L2 = (K-1)*NXYYP                                                  ISC29620
      IF (L92 .EQ. 1) L2 = L2+NXYYP                                     ISC29630
      CALL SUMMER(CON(L2+1),CON(L1+1),K+1)                              ISC29640
      IF (ISW(11) .EQ. 2) GO TO 2320                                    ISC29650
 2300 CONTINUE                                                          ISC29660
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 1) GO TO 2320                    ISC29670
      IF (L92 .EQ. 2) GO TO 2310                                        ISC29680
      L2 = 0                                                            ISC29690
      IF (L92 .EQ. 0) L2 = (1+L91)*NXYYP+L9                             ISC29700
      IF (L2 .NE. 0.AND.K .EQ. 1) GO TO 2320                            ISC29710
      CALL SUMMER(CON(L2+1),CON(L1+1),K)                                ISC29720
      GO TO 2320                                                        ISC29730
 2310 CALL SUMMER(Z,CON(L1+1),K)                                        ISC29740
 2320 CONTINUE                                                          ISC29750
      IF (ISW(11) .EQ. 2) GO TO 2360                                    ISC29760
      IF (ISW(8) .EQ. 2.OR.ISW(7) .EQ. 1) GO TO 2360                    ISC29770
      IF (ISW(1) .EQ. 2) GO TO 2340                                     ISC29780
      IF (L92 .EQ. 2) GO TO 2330                                        ISC29790
      L2 = 0                                                            ISC29800
      IF (L92 .EQ. 0) L2 = (1+L91)*NXYYP+L9                             ISC29810
      CALL SUMMER(CON(L2+1),CON,-1)                                     ISC29820
      GO TO 2340                                                        ISC29830
 2330 CALL SUMMER(Z,CON,-1)                                             ISC29840
 2340 CONTINUE                                                          ISC29850
      KK = 2                                                            ISC29860
C     PRINT INDIVIDUAL SOURCES - ANNUAL                                 ISC29870
      IF (L92 .EQ. 2) GO TO 2350                                        ISC29880
      CALL OUTPT(KK,K,X,Y,CON(L2+1),1)                                  ISC29890
      GO TO 2360                                                        ISC29900
 2350 CALL OUTPT(KK,K,X,Y,Z,1)                                          ISC29910
 2360 CONTINUE                                                          ISC29920
C     INCREMENT SOURCE SAVE NUMBERS FOR INTERNAL STORAGE OF SOURCES     ISC29930
      IF (NOTAP .EQ. 0) GO TO 2400                                      ISC29940
 2370 KSO = KSO+1                                                       ISC29950
      L9 = KSO*NXYSEA                                                   ISC29960
      GO TO 2400                                                        ISC29970
 2380 IF (NG .EQ. 1.AND.ISW(12) .GE. 0) GO TO 2390                      ISC29980
      J = NOCOMB(NG)                                                    ISC29990
      IF (NUMS .GT. IABS(IDSORC(J+NGT))) GO TO 2410                     ISC30000
 2390 IF (NOTAP .EQ. 0) GO TO 2400                                      ISC30010
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 2370                      ISC30020
      CALL CHECKR(NGROUP,J)                                             ISC30030
      IF (J .NE. 0) GO TO 2370                                          ISC30040
 2400 CONTINUE                                                          ISC30050
      GO TO 790                                                         ISC30060
C                                                                       ISC30070
C     END LOOP OVER SOURCES, RETURN FOR NEXT SOURCE                     ISC30080
C***********************************************************************ISC30090
C                                                                       ISC30100
C     BEGIN OUTPUT FOR COMBINED SOURCES                                 ISC30110
 2410 IF (ISW(8) .EQ. 1.AND.ISW(11) .NE. 2) GO TO 2480                  ISC30120
      NT4 = 1                                                           ISC30130
      KK = 1                                                            ISC30140
      DO 2440 K=1,NSEASN                                                ISC30150
      L1 = (K-1)*NXYYP                                                  ISC30160
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      IF (L92 .EQ. 1) L1 = L1+NXXYYP                                    ISC30170
      IF (ISW(7) .EQ. 2) GO TO 2420                                     ISC30180
C     PRINT SUM OF SOURCES - SEASONAL                                   ISC30190
      CALL OUTPT(KK,K,X,Y,CON(L1+1),2)                                  ISC30200
 2420 IF (ISW(7) .LE. 1) GO TO 2440                                     ISC30210
      IF (L92 .EQ. 2) GO TO 2430                                        ISC30220
      CALL SUMMER(CON,CON(L1+1),K)                                      ISC30230
      GO TO 2440                                                        ISC30240
 2430 CALL SUMMER(Z,CON(L1+1),K)                                        ISC30250
 2440 CONTINUE                                                          ISC30260
      IF (ISW(7) .LE. 1) GO TO 2480                                     ISC30270
      IF (ISW(1) .EQ. 2) GO TO 2460                                     ISC30280
      IF (L92 .EQ. 2) GO TO 2450                                        ISC30290
      CALL SUMMER(CON,CON,-1)                                           ISC30300
      GO TO 2460                                                        ISC30310
 2450 CALL SUMMER(Z,CON,-1)                                             ISC30320
 2460 CONTINUE                                                          ISC30330
      KK = 2                                                            ISC30340
C     PRINT SUM OF SOURCES - ANNUAL                                     ISC30350
      IF (L92 .EQ. 2) GO TO 2470                                        ISC30360
      CALL OUTPT(KK,K,X,Y,CON,2)                                        ISC30370
      GO TO 2480                                                        ISC30380
 2470 CALL OUTPT(KK,K,X,Y,Z,2)                                          ISC30390
 2480 CONTINUE                                                          ISC30400
C                                                                       ISC30410
C     END OF COMBINED SOURCES, IF ISW(11) = 2 GO DO SECOND PASS FOR     ISC30420
C     DISPLAY OF MAXIMA. OTHERWISE GO TO NEXT GROUP OF COMBINED SOURCES ISC30430
      ISW(6) = 0                                                        ISC30440
      IF (ISW(11) .EQ. 2) GO TO 710                                     ISC30450
      GO TO 700                                                         ISC30460
C                                                                       ISC30470
C     END OF COMBINED SOURCES LOOP                                      ISC30480
C     ***************************************************************ISC30490
C                                                                       ISC30500
C     ERRORS COME TO HERE                                               ISC30510
 2490 IF (ISW(5) .LE. 0.OR.ISW(5) .EQ. 2) GO TO 2500                    ISC30520
      IF (IFLG2 .NE. 0) GO TO 2500                                      ISC30530
      IF (NG .GT. 1.OR.ISW(12) .EQ. -1) GO TO 2500                      ISC30540
C     WRITE END OF TAPE RECORD                                          ISC30550
      NSOR(1) = 999999                                                  ISC30560
      WRITE (NUNT) (NSOR(I),I=1,NSO)                                    ISC30570
      IF (ISW(15) .LT. 0) GO TO 2500                                    ISC30580
      ENDFILE NUNT                                                      ISC30590
      ENDFILE NUNT                                                      ISC30600
C                                                                       ISC30610
C     END OF PROG. CLOSE ACTIVE FILES                                   ISC30620
C     ***************************************************************ISC30630
 2500 IF (NT .GT. 0) CALL OUTPT(-4,NT,X,Y,Z,NTT)                        ISC30640
      WRITE (JUNT,9024) K1                                              ISC30650
      IF (JUNT .EQ. 6.OR.INDFL .EQ. 1) GO TO 2510                       ISC30660
      ENDFILE JUNT                                                      ISC30670
      ENDFILE JUNT                                                      ISC30680
 2510 CONTINUE                                                          ISC30690
      STOP                                                              ISC30700
 9001 FORMAT (20A4)                                                     ISC30710
 9002 FORMAT (8F10.0)                                                   ISC30720
 9003 FORMAT (/54H **** ERROR - NUMBER OF SETTLING VELOCITIES FOR SOURCEISC30730
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   1,I7,49H IS ZERO, MUST INPUT FOR GRAVITATIONAL DEPOSITION)          ISC30740
                                                                       ISC30750
9004 FORMAT (10X,19HNUMBER OF SOURCES =,I4/                            ISC30760
    210X,37HNUMBER OF X AXIS GRID SYSTEM POINTS =,I5/                  ISC30770
    310X,37HNUMBER OF Y AXIS GRID SYSTEM POINTS =,I5/                  ISC30780
    410X,26HNUMBER OF SPECIAL POINTS =,I5/                             ISC30790
    510X,19HNUMBER OF SEASONS =,I4/                                    ISC30800
    610X,30HNUMBER OF WIND SPEED CLASSES =,I4/                         ISC30810
    710X,29HNUMBER OF STABILITY CLASSES =,I4/                          ISC30820
    810X,34HNUMBER OF WIND DIRECTION CLASSES =,I4/                     ISC30830
    910X,43HFILE NUMBER OF DATA FILE USED FOR REPORTS =,I4)            ISC30840
9005 FORMAT (10X,22HTHE PROGRAM IS RUN IN ,3A4)                        ISC30850
9006 FORMAT (72H *** WARNING - FREQ. OF OCCURRENCE OF SPD VS. DIR IS NOISC30860
    1T 1.0 FOR SEASON ,I2,19H, PROG. DIVIDES BY ,F9.5,13H TO NORMALIZE)ISC30870
9007 FORMAT (10X,52HCONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR ISC30880
    1=,E14.8/                                                          ISC30890
    210X,41HACCELERATION OF GRAVITY (METERS/SEC**2) =,F7.3/            ISC30900
    310X,46HHEIGHT OF MEASUREMENT OF WIND SPEED (METERS) =,F8.3/       ISC30910
    610X,72HCORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTISC30920
    7H (DEGREES) =,F8.3/                                               ISC30930
    810X,19HDECAY COEFFICIENT =,E14.8)                                 ISC30940
9008 FORMAT (10X,25HPROGRAM OPTION SWITCHES =,25(I2,1H,))              ISC30950
9009 FORMAT (2X,3A4,A3,1X,A1,6A4,2H (,A4,A3,2H)=,6(F11.2,1H,)/(10X,10(FISC30960
    111.2,1H,)))                                                       ISC30970
9010 FORMAT (1H0,27X,46H  - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -/ISC30980
    1/20X,6(11HSTABILITY  )/20X,6(8HCATEGORY,I2,1X))                   ISC30990
9011 FORMAT (10X,6HSEASON,I3,6F11.4)                                   ISC31000
9012 FORMAT (1H0,36X,32H- MIXING LAYER HEIGHT (METERS) -/)             ISC31010
9013 FORMAT (50X,6HSEASON,I2/21X,6(12H  WIND SPEED)/21X,6(10H  CATEGORYISC31020
    1,I2))                                                             ISC31030
9014 FORMAT (1X,18HSTABILITY CATEGORY,I2,6E12.6)                       ISC31040
9015 FORMAT (1H0,20X,66H- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTISC31050
    1ION AND STABILITY -)                                              ISC31060
9016 FORMAT (1H0,47X,6HSEASON,I2)                                      ISC31070
9017 FORMAT (1H0,41X,18HSTABILITY CATEGORY,I2//20X,6(12H  WIND SPEED)/2ISC31080
    10X,6(10H  CATEGORY,I2)/8X,13HDIRECTION     ,6(1H(,F7.4,4HMPS))/7X,0ISC31090
    29H(DEGREES))                                                      ISC31100
9018 FORMAT (10X,F7.3,3X,6(F12.8))                                     ISC31110
9019 FORMAT (1H0,24X,66H- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGRISC31120
    1EES KELVIN/METER) -/)                                             ISC31130
9020 FORMAT (21X,6(12H  WIND SPEED)/21X,6(10H  CATEGORY,I2))           ISC31140
9021 FORMAT (1X,18HSTABILITY CATEGORY,I2,6E12.6)                       ISC31150
9022 FORMAT (1H0,39X,36H- WIND PROFILE POWER LAW EXPONENTS -/)         ISC31160
9023 FORMAT (I5,3I1,2F10.0,7F7.0,I1,I2)                                ISC31170
9024 FORMAT (1H1/////1X,41(1H*),22H END OF ISCLT PROGRAM,,I6,19H SOURCEISC31180
    1S PROCESSED ,40(1H*))                                             ISC31190
9025 FORMAT (35H WARNING - DISTANCE BETWEEN SOURCE ,I6,15H AND POINT X,ISC31200
    1Y=,F11.2,1H,,F11.2,23H IS LESS THAN PERMITTED)                    ISC31210
9027 FORMAT (/81H **** ERROR - DISP CANNOT EQUAL 2 WHEN QFLG IS GREATERISC31220
    1 THAN 0. OFFENDING SOURCE =,I5,18H, PROG. TERMINATED)             ISC31230
9028 FORMAT (/45H **** ERROR - DISP GREATER THAN 0 FOR SOURCE ,I5,40H, ISC31240
    1NO MORE TAPE SOURCES, PROG. TERMINATED)                           ISC31250
9029 FORMAT (/45H **** ERROR - DISP GREATER THAN 0 FOR SOURCE ,I5,56H, ISC31260
    1CANNOT FIND CORRESPONDING TAPE SOURCE, PROG TERMINATED)           ISC31270
9030 FORMAT (32H0WARNING - HW/HB > 5 FOR SOURCE ,I5,89H PROG. USES LATEISC31280
    1RAL VIRTUAL DIST. FOR UPPER BOUND OF CONCENTRATION (DEPOSITION). IISC31290
    2F LOWER/60H BOUND IS DESIRED SET WAKE EFFECTS FLAG (WAKE) = 1 AND ISC31300
    3RERUN)                                                            ISC31310
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9031 FORMAT (10X,40HSOURCES USED TO FORM SOURCE COMBINATION ,I2,6H ARE  ISC31310
     1-,10(I6,1H,))                                                    ISC31320
9032 FORMAT (10X,17(I6,1H,))                                           ISC31330
9033 FORMAT (10X,48HALL SOURCES ARE USED TO FORM SOURCE COMBINATION ,I2ISC31340
     1)                                                                ISC31350
9034 FORMAT (30H0*** ERROR - AVAILABLE CORE = ,I6,19H, PROBLEM REQUIRESISC31360
     1 ,I6,16H OR MORE LOCATIONS/)                                     ISC31370
9035 FORMAT (/)40***** ERROR - MAX NO. OF SOURCES EXCEEDED FOR NGROUP OR ISC31380
     1ISW(11)=2 OPTION/)                                               ISC31390
9036 FORMAT (48H *** WARNING - EXIT VELOCITY IS <= 0 FOR SOURCE ,I5,35HISC31400
     1 PROG  SETS TO 1.0E-5 AND CONTINUES)                             ISC31410
9037 FORMAT (44H *** ERROR - STACK DIAMETER <= 0 FOR SOURCE ,I5)       ISC31420
9038 FORMAT (35H *** ERROR - SIGYO <= 0 FOR SOURCE ,I5)                ISC31430
9039 FORMAT (35H *** ERROR - SIGZO <= 0 FOR SOURCE ,I5)                ISC31440
9040 FORMAT (32H *** ERROR - X0 <= 0 FOR SOURCE ,I5)                   ISC31450
9041 FORMAT (20H *** ERROR - SOURCE ,I5,32H LESS THAN VALUE THAN LAST SOUISC31460
     1RCE ,I5,6H READ.)                                                ISC31470
9042 FORMAT (34H *** ERROR - DISP CODE FOR SOURCE ,I5,17H IS OUT OF RANISC31480
     1GE.)                                                             ISC31490
9043 FORMAT (34H *** ERROR - TYPE CODE FOR SOURCE ,I5,17H IS OUT OF RANISC31500
     1GE.)                                                             ISC31510
9044 FORMAT (34H *** ERROR - QFLG CODE FOR SOURCE ,I5,17H IS OUT OF RANISC31520
     1GE.)                                                             ISC31530
9045 FORMAT (125H0WARNING - UNABLE TO DETERMINE IF ALL SOURCES WILL FITISC31540
     1 IN CORE (NSOURC<0). IF PROGRAM ABORTS, RERUN USING OUTPUT TAPE ORISC31550
     2 FILE/)                                                          ISC31560
9046 FORMAT(7X,' WARNING - BUILDING DIMENSIONS ON CARD GROUP 17 FOR SOUISC31570
     1RCE NO. ',I5,' DO NOT MEET THE SCHULMAN-SCIRE CRITERIA. ',/,7X,' TISC31580
     2HEREFORE, DIRECTION SPECIFIC BUILDING DIMENSIONS WILL NOT BE INPUTISC31590
     3 INTO THE MODEL. ')                                              ISC31600
9047 FORMAT (35H WARNING - DISTANCE BETWEEN SOURCE ,I6,15H AND POINT X,ISC31610
     1Y=,F11.2,1H,,F11.2,23H IS LESS THAN PERMITTED,15H FOR SECTOR(S): ,ISC31620
     2/,5X,16(I5,','))                                                 ISC31630
9048 FORMAT(32H0WARNING - HW/HB > 5 FOR SOURCE ,I5,93H PROG. USES LATERISC31640
     1AL VIRTUAL DIST. FOR UPPER BOUND OF CONCENTRATION (DEPOSITION) IN ISC31650
     2SECTOR(S):/,5X,15(I5,','),I5,'.')                                ISC31660
9049 FORMAT(/91H0*** ERROR - DIRECTION SPECIFIC BUILDING HEIGHT OR WIDTISC31670
     1H GREATER THAN 9999. FOR SOURCE NO: ,I5)                         ISC31680
9050 FORMAT(1X,'IF LOWER BOUND IS DESIRED SET THE DIRECTION SPECIFIC BUISC31690
     1ILDING HEIGHT TO < 0 (WAKE EFFECTS FLAG) AND RERUN.')            ISC31700
9051 FORMAT(3(/))                                                      ISC31710
9501 FORMAT(1X,20A4)                                                   ISC31720
9502 FORMAT(1X,8E14.5)                                                 ISC31730
9503 FORMAT(1I5,3I2,9(1PE10.3E1),2I3)                                  ISC31740
9504 FORMAT(1X,8E14.5)                                                 ISC31750
9599 FORMAT(1X,6F10.8)                                                 ISC31760
     END                                                               ISC31770
C                                                                      ISC31780
C                                                                      ISC31790
     SUBROUTINE OUTPT(KK,K,X,Y,Z,JSS)                                  ISC31800
C                SUBROUTINE OUTPT (VERSION 87338), PART OF ISCLT.      ISC31810
C    THIS SUBROUTINE PRINTS THE INPUT SOURCE DATA AND ALL CONCENTRATIONISC31820
C    (DEPOSITION) CALCULATIONS                                         ISC31830
     COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NGRYPT,NSEASN,NSPEED,NSTBLE,    ISC31840
    1NSCTOR,ISW(25),UNITS(20),TITLE(20),NOFILE                         ISC31850
     COMMON /REST/ IUNT,JUNT,IDXY,IDXYYP,ISTBLE(6),IFLG3,LINE,NLINES,  ISC31860
    1ICARD,NYPSS,NYPSS,MUNT,MUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC31870
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     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC31800
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXNY,IWAKSW(16)                 ISC31890
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,DW,BL,NVS,VS(20),  ISC31900
     1FRQ(20),GAMMA(20),DSBH(16),DSBW(16),Q(6,6,4),QFLG,WAKE           ISC31910
      COMMON /HEAD/ MSG3(4),MSG4(8),IS,N3,I3,M3,ILN,LSTILN             ISC31920
      DIMENSION X(1),Y(1),Z(1),MSG1(6),MSG2(6),IXS(11),IYS(11),ZMX(10)  ISC31930
     1,MSG5(4),MSG6(10),IX10(50),IY10(50)                              ISC31940
      EQUIVALENCE (SIGYO,TS),(SIGZO,VEL),(BW,X0)                       ISC31950
      INTEGER TITLE,UNITS,TYPE,QFLG,WAKE                               ISC31960
      DATA IX10,IY10/100*0/                                            ISC31970
      DATA MSG1/4H STA,2HCK,4HVOLU,2HME,4H ARE,1HA/                    ISC31980
      DATA IBLNK,IX/1H ,1HX/                                           ISC31990
      DATA IAST/1H*/                                                   ISC32000
      DATA MSG2/4HSTAB,4HILIT,1HY,1H ,4HSPEE,1HD/                      ISC32010
      DATA MSG3/4HSEAS,4HONAL,4H  AN,4HNUAL/                           ISC32020
      DATA MSG4/4HCONC,4HENTR,4HATIO,1HN,4H DEP,4HOSIT,3HION,1H /      ISC32030
      DATA MSG5/4HPER ,4HSQUA,4HRE M,4HETER/                           ISC32040
      DATA MSG10/4HDIST,4HANCE,2*1H ,4HRANG,4HE   ,2*1H ,4HAZIM,4HUTH , ISC32050
     14HBEAR,3HING/                                                    ISC32060
      IF (KK .EQ. -4) GO TO 880                                        ISC32070
      IS = JSS                                                         ISC32080
      IF (KK .NE. 4) GO TO 240                                         ISC32090
C     PRINT SOURCE DATA                                                ISC32100
C*****************************************************************************ISC32110
      ILN = 0                                                          ISC32120
      NUM = 1                                                          ISC32130
      IF (TYPE .EQ. 2) GO TO 20                                        ISC32140
      IF (TYPE .EQ. 1) GO TO 10                                        ISC32150
      NUM = 3                                                          ISC32160
      GO TO 20                                                         ISC32170
   10 NUM = 2                                                          ISC32180
   20 CONTINUE                                                         ISC32190
      M1 = 0                                                           ISC32200
      IF (ISW(16) .NE. 0) GO TO 60                                     ISC32210
      IF (ISW(11) .NE. 2.AND.ISW(8) .NE. 2) GO TO 60                   ISC32220
      IF (NVS .EQ. 0) GO TO 30                                         ISC32230
      ZMX(1) = FLOAT(NVS)/7.0                                          ISC32240
      M1 = ZMX(1)                                                      ISC32250
      IF (ZMX(1) .GT. FLOAT(M1)) M1 = M1+1                             ISC32260
      M1 = 3*M1+2                                                      ISC32270
   30 IF (QFLG .GT. 0) GO TO 40                                        ISC32280
      M1 = M1+3                                                        ISC32290
      GO TO 60                                                         ISC32300
   40 IF (QFLG .EQ. 3) GO TO 50                                        ISC32310
      J = NSTBLE                                                       ISC32320
      IF (QFLG .EQ. 2) J = NSPEED                                      ISC32330
      M1 = M1+2*J                                                      ISC32340
      GO TO 60                                                         ISC32350
   50 M1 = M1+NSEASN*(3+NSPEED)+1                                      ISC32360
   60 CONTINUE                                                         ISC32370
      DO 70 I=1,10                                                     ISC32380
   70 MSG6(I) = UNITS(10+I)                                            ISC32390
      IF (TYPE .NE. 2) GO TO 90                                        ISC32400
      J = 0                                                            ISC32410
      DO 80 I=1,10                                                     ISC32420
      IF (MSG6(I) .NE. IBLNK) GO TO 80                                 ISC32430
      J = J+1                                                          ISC32440
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      IF (J .GT. 4) GO TO 90                                                    ISC32450
      MSG6(I) = MSG5(J)                                                         ISC32460
   80 CONTINUE                                                                  ISC32470
   90 CONTINUE                                                                  ISC32480
      I1 = IBLNK                                                                ISC32490
      I2 = IBLNK                                                                ISC32500
      IF (ICARD .NE. 0) GO TO 100                                               ISC32510
      I2 = IX                                                                   ISC32520
      GO TO 110                                                                 ISC32530
  100 I1 = IX                                                                   ISC32540
  110 NLN = 1                                                                   ISC32550
C                                                                               ISC32560
      IF (LSTILN .EQ. ILN) NLN = 0                                              ISC32570
      CALL TITLR(NUM1+M1,1,NLN)                                                 ISC32580
      LINE = LINE-M1                                                            ISC32590
  120 I3 = 2*TYPE+1                                                             ISC32600
      IF (TYPE .EQ. 1) GO TO 130                                                ISC32610
      IF (TYPE .EQ. 2) GO TO 140                                                ISC32620
C     OUTPUT STACK INFORMATION                                                  ISC32630
      WRITE (JUNT,9002) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,TS,VELISC32640
     1,D,HB,BW,WAKE                                                             ISC32650
      GO TO 150                                                                 ISC32660
  130 WRITE (JUNT,9003) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,SIGYO,ISC32670
     1SIGZO                                                                     ISC32680
      GO TO 150                                                                 ISC32690
  140 WRITE (JUNT,9004) I1,I2,NUMS,MSG1(I3),MSG1(I3+1),DX,DY,H,ZS,X0            ISC32700
  150 CONTINUE                                                                  ISC32710
C     OUTPUT PARTICULATE INFORMATION IF PRESENT                                 ISC32720
      IF (NVS .LE. 0) GO TO 170                                                 ISC32730
      CALL TITLR(1,1,0)                                                         ISC32740
      WRITE (JUNT,9018)                                                         ISC32750
      II = -6                                                                   ISC32760
  160 II = II+7                                                                 ISC32770
      IF (II .GT. NVS) GO TO 170                                                ISC32780
      JJ = II+6                                                                 ISC32790
      IF (JJ .GT. NVS) JJ = NVS                                                 ISC32800
      CALL TITLR(4,1,0)                                                         ISC32810
      WRITE (JUNT,9019) (I,I=II,JJ)                                             ISC32820
      WRITE (JUNT,9020) (VS(I),I=II,JJ)                                         ISC32830
      WRITE (JUNT,9021) (FRQ(I),I=II,JJ)                                        ISC32840
      WRITE (JUNT,9022) (GAMMA(I),I=II,JJ)                                      ISC32850
      GO TO 160                                                                 ISC32860
  170 CONTINUE                                                                  ISC32870
C     OUTPUT DIRECTION SPECIFIC BUILDING DIMENSIONS.                            ISC32880
      IF (TYPE .GT. 0) GOTO 178                                                 ISC32890
      IF (HB .LT. 0.0) THEN                                                     ISC32900
      CALL TITLR(7,1,0)                                                         ISC32910
      WRITE(JUNT,9033)                                                          ISC32920
C     SET SWITCH FOR TYPE OF BUILDING DOWNWASH MODIFICATION                     ISC32930
      DO 175 J=1,NSCTOR                                                         ISC32940
      IWAKSW(J)=0                                                               ISC32950
      IF (DSBH(J) .LT. 0.0) IWAKSW(J)=1                                         ISC32960
      DSBH(J) = ABS(DSBH(J))                                                    ISC32970
  175 CONTINUE                                                                  ISC32980
      WRITE(JUNT,9034) (J,DSBH(J),DSBW(J),IWAKSW(J),J=1,NSCTOR)                 ISC32990
      ENDIF                                                                     ISC33000
  178 CONTINUE                                                                  ISC33010
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C     OUTPUT SOURCE STRENGTHS                                                  ISC33020
      IF (QFLG .EQ. 3) GO TO 210                                               ISC33030
      IF (QFLG .NE. 0) GO TO 180                                               ISC33040
C     VARIES BY SEASON ONLY                                                    ISC33050
      CALL TITLR(3,1,0)                                                        ISC33060
      WRITE (JUNT,9008) MSG6                                                   ISC33070
      WRITE (JUNT,9005) (L,L=1,4),(Q(1,1,L),L=1,NSEASN)                        ISC33080
      GO TO 230                                                                ISC33090
  180 J = NSPEED                                                               ISC33100
      IF (QFLG .EQ. 1) J = NSTBLE                                              ISC33110
      I1 = 3*QFLG-2                                                            ISC33120
      CALL TITLR(2,1,0)                                                        ISC33130
      WRITE(JUNT,9008) MSG6                                                    ISC33140
      WRITE(JUNT,9006) MSG2(I1),MSG2(I1+1),MSG2(I1+2),(I,I=1,NSEASN)           ISC33150
      DO 200 L = 1,J                                                           ISC33160
      CALL TITLR(1,1,0)                                                        ISC33170
      I2 = 1                                                                   ISC33180
      I3 = L                                                                   ISC33190
      IF(QFLG .EQ. 1) GO TO 190                                                ISC33200
      I2 = L                                                                   ISC33210
      I3 = 1                                                                   ISC33220
  190 WRITE(JUNT,9007) L,(Q(I2,I3,I),I=1,NSEASN)                               ISC33230
  200 CONTINUE                                                                 ISC33240
      GO TO 230                                                                ISC33250
  210 CALL TITLR(1,1,0)                                                        ISC33260
      WRITE (JUNT,9008) MSG6                                                   ISC33270
      DO 220 L=1,NSEASN                                                        ISC33280
      CALL TITLR(3,1,0)                                                        ISC33290
      WRITE (JUNT,9009) L,(I,I=1,NSTBLE)                                       ISC33300
      DO 220 J=1,NSPEED                                                        ISC33310
      CALL TITLR(1,1,0)                                                        ISC33320
      WRITE (JUNT,9010) J,(Q(J,I,L),I=1,NSTBLE)                                ISC33330
  220 CONTINUE                                                                 ISC33340
  230 CONTINUE                                                                 ISC33350
      GO TO 870                                                                ISC33360
C                                                                              ISC33370
C     PRINT CALCULATIONS ON GRID SYSTEM                                        ISC33380
C*************************************************************************** ISC33390
  240 N3 = 1                                                                   ISC33400
      IF (KK .EQ. 2) N3 = 3                                                    ISC33410
      IF (KK .NE. 3.AND.ISW(10) .EQ. 1) GO TO 440                              ISC33420
      M3 = 0                                                                   ISC33430
      IF (ISW(1) .EQ. 2) M3 = 4                                                ISC33440
      M1 = 1                                                                   ISC33450
      IF (ISW(2) .EQ. 2) M1 = 2                                                ISC33460
      M2 = 1                                                                   ISC33470
      IF (ISW(2) .EQ. 2) M2 = 3                                                ISC33480
      M4 = 1                                                                   ISC33490
      IF (ISW(2) .EQ. 2) M4 = 2                                                ISC33500
      IF (IS .EQ. 2) GO TO 260                                                 ISC33510
      IF (NG. LE. 1.OR.KK .EQ. 3) GO TO 260                                    ISC33520
      IF (NOCOMB(NG-1) .EQ. 0) GO TO 250                                       ISC33530
      CALL CHECKR(NG-1,I1)                                                     ISC33540
      IF (I1 .EQ. 0) GO TO 260                                                 ISC33550
  250 CONTINUE                                                                 ISC33560
      IF (NOCOMB(NG) .EQ. 1.AND.IDSORC(NGT+1) .GE. 0) GO TO 260                ISC33570
      IF (ISW(11) .EQ. 1) GO TO 870                                            ISC33580
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      IF (ISW(12) .EQ. 1) GO TO 870                                     ISC33590
      GO TO 440                                                         ISC33600
  260 CONTINUE                                                          ISC33610
      IF (NXPNTS .EQ. 0) GO TO 360                                      ISC33620
      ILN = 1                                                           ISC33630
      NN = 2                                                            ISC33640
      IF (ISW(16).EQ.0.OR.KK.EQ.3.OR.LINE+10.GT.NLINES) NN = 1          ISC33650
C                                                                       ISC33660
      LSTILN = ILN                                                      ISC33670
      LX = 1                                                            ISC33680
      I2 = 0                                                            ISC33690
  270 I1 = I2+1                                                         ISC33700
      IF (I1 .GT. NXPNTS) GO TO 360                                     ISC33710
      I2 = I1+8                                                         ISC33720
      IF (I2 .GT. NXPNTS) I2 = NXPNTS                                   ISC33730
      J4 = 1                                                            ISC33740
      J3 = NYPNTS+1                                                     ISC33750
  280 J3 = J3-1                                                         ISC33760
      IF (J3 .EQ. 0) GO TO 270                                          ISC33770
      IF (J4 .NE. 0) GO TO 340                                          ISC33780
      CALL TITLR(1,3,0)                                                 ISC33790
      IF (LINE .GT. 3) GO TO 330                                        ISC33800
  290 WRITE (JUNT,9001)                                                 ISC33810
      LINE = LINE+1                                                     ISC33820
      IF (JSS .EQ. 3) THEN                                              ISC33830
      CALL HEADNG(KK,-1)                                                ISC33840
      ELSE                                                              ISC33850
      CALL HEADNG(KK,K)                                                 ISC33860
      ENDIF                                                             ISC33870
  300 CONTINUE                                                          ISC33880
      WRITE (JUNT,9011) (MSG10(I,M1),I=1,2),(X(I),I=I1,I2)             ISC33890
      IF (KK .EQ. 3) GO TO 310                                          ISC33900
      WRITE (JUNT,9012) (MSG10(I,M2),I=1,4),(MSG9(I,M4),I=1,2),(MSG4(I+MISC33910
     13),I=1,4)                                                         ISC33920
      GO TO 320                                                         ISC33930
  310 CONTINUE                                                          ISC33940
      IF (JSS .EQ. 3) THEN                                              ISC33950
      WRITE (JUNT,9032) (MSG10(I,M2),I=1,4),(MSG9(I,M4),I=1,2)          ISC33960
      ELSE                                                              ISC33970
      WRITE (JUNT,9013) (MSG10(I,M2),I=1,4),(MSG9(I,M4),I=1,2)          ISC33980
      ENDIF                                                             ISC33990
  320 LINE = LINE+6                                                     ISC34000
  330 J4 = (J3-1)*NXPNTS                                                ISC34010
      WRITE (JUNT,9014) Y(J3),(Z(J4+I),I=I1,I2)                         ISC34020
      J4 = 0                                                            ISC34030
      LX = 0                                                            ISC34040
      GO TO 280                                                         ISC34050
  340 IF (LX .EQ. 0) GO TO 350                                          ISC34060
      CALL TITLR(1,3,NN)                                                ISC34070
      GO TO 290                                                         ISC34080
  350 CALL TITLR(8,3,0)                                                 ISC34090
      LINE = LINE-7                                                     ISC34100
      IF (LINE .LE. 3) GO TO 290                                        ISC34110
      WRITE (JUNT,9001)                                                 ISC34120
      WRITE (JUNT,9001)                                                 ISC34130
      LINE = LINE+2                                                     ISC34140
      GO TO 300                                                         ISC34150
```

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C                                                                       ISC34160
C     PRINT CALCULATIONS AT SPECIAL DISCRETE POINTS                     ISC34170
C*************************************************************************ISC34180
                                                                        ISC34190
  360 CONTINUE                                                          ISC34200
      IF (KK .NE. 3.AND.ISW(12) .EQ. 1) GO TO 440                       ISC34210
      IF (NOHYPT .LE. 0) GO TO 440                                      ISC34220
      ILN = 2                                                           ISC34230
      J3 = NOXYY                                                        ISC34240
      LX = 1                                                            ISC34250
      NN = 2                                                            ISC34260
      IF (LSTILN .EQ. 1) GO TO 370                                      ISC34270
      IF (ISW(16) .EQ. 0.OR.KK .EQ. 3) NN = 1                           ISC34280
  370 CONTINUE                                                          ISC34290
      I2 = 0                                                            ISC34300
  380 I1 = I2+1                                                         ISC34310
      IF (I1 .GT. NOHYPT) GO TO 430                                     ISC34320
      I2 = I1+2                                                         ISC34330
      IF (I2 .GT. NOHYPT) I2 = NOHYPT                                   ISC34340
      IF (LX .EQ. 0) GO TO 410                                          ISC34350
      CALL TITLR(9,3,NN)                                                ISC34360
      LINE = LINE-8                                                     ISC34370
  390 CONTINUE                                                          ISC34380
      LINE = LINE-1                                                     ISC34390
  400 CONTINUE                                                          ISC34400
      WRITE (JUNT,9001)                                                 ISC34410
      LINE = LINE+2                                                     ISC34420
      IF (JSS .EQ. 3) THEN                                              ISC34430
      CALL HEADNG(KK,-1)                                                ISC34440
      ELSE                                                              ISC34450
      CALL HEADNG(KK,K)                                                 ISC34460
      ENDIF                                                             ISC34470
      LSTILN = 1                                                        ISC34480
      GO TO 420                                                         ISC34490
  410 CONTINUE                                                          ISC34500
      CALL TITLR(1,3,0)                                                 ISC34510
      IF (LINE .LE. 3) GO TO 390                                        ISC34520
  420 WRITE (JUNT,9015) (X(NOXPNTS+J),Y(NOYPNTS+J),Z(J3+J),J=I1,I2)     ISC34530
      LX = 0                                                            ISC34540
      GO TO 380                                                         ISC34550
  430 LSTILN = 2                                                        ISC34560
  440 CONTINUE                                                          ISC34570
      IF (ISW(10) .EQ. 0.OR.KK.EQ. 3) GO TO 870                         ISC34580
C                                                                       ISC34590
C     FIND MAX TEN VALUES OF CONCENTRATION (DEPOSITION)                 ISC34600
C*************************************************************************ISC34610
      IF (ISW(11) .NE. 2) GO TO 470                                     ISC34620
C     DETERMINE AND SAVE INDICES OF THE MAX 10 POINTS FOR THE COMBINED  ISC34630
C     SOURCES FOR SEASON 1, 2, --- , ANNUAL.                            ISC34640
      IF (IS .EQ. 1) GO TO 870                                          ISC34650
      L = (K-1)*10                                                      ISC34660
      IF (KK .EQ. 2) L = NSEASN*10                                      ISC34670
  450 CALL MXIMUM(IXS,IYS,ZMX,Z)                                        ISC34680
      DO 460 I=1,10                                                     ISC34690
      IX10(L+I) = IXS(I)                                                ISC34700
  460 IY10(L+I) = IYS(I)                                                ISC34710
      GO TO 870                                                         ISC34720
  470 CONTINUE
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      L6 = 0                                                          ISC34730
      L = 0                                                           ISC34740
      L4 = 0                                                          ISC34750
      IF (NXYPT .EQ. 0) GO TO 490                                     ISC34760
      IF (NXPNTS .EQ. 0) GO TO 500                                    ISC34770
C     HAVE BOTH TYPES OF RECEPTORS                                    ISC34780
      IF (ISW(2) .EQ. ISW(3)) GO TO 490                               ISC34790
      IF (NXYY .GT. NXYPT) GO TO 480                                  ISC34800
C     USE ISW(3) AS PRIMARY UNITS DISPLAY                             ISC34810
      L = ISW(3)                                                      ISC34820
      L4 = 2                                                          ISC34830
      GO TO 510                                                       ISC34840
C     USE ISW(2) AS PRIMARY UNITS DISPLAY                             ISC34850
  480 L = ISW(2)                                                      ISC34860
      L4 = 1                                                          ISC34870
      GO TO 510                                                       ISC34880
  490 L = ISW(2)                                                      ISC34890
      L4 = 0                                                          ISC34900
      GO TO 510                                                       ISC34910
  500 L = ISW(3)                                                      ISC34920
      L4 = 0                                                          ISC34930
  510 CONTINUE                                                        ISC34940
      M1 = 1                                                          ISC34950
      M2 = 3                                                          ISC34960
      M4 = 4                                                          ISC34970
      M5 = 2                                                          ISC34980
      M6 = 3                                                          ISC34990
      M7 = 4                                                          ISC35000
      M8 = 2                                                          ISC35010
      IF (L .LT. 2) GO TO 520                                         ISC35020
      M1 = 2                                                          ISC35030
      M2 = 1                                                          ISC35040
      M4 = 2                                                          ISC35050
      M5 = 3                                                          ISC35060
      M6 = 1                                                          ISC35070
      M7 = 2                                                          ISC35080
      M8 = 3                                                          ISC35090
  520 CONTINUE                                                        ISC35100
      IF (ISW(11) .NE. 1) GO TO 540                                   ISC35110
      CALL MXIMUM(IXS,IYS,ZMX,Z)                                      ISC35120
      L2 = 0                                                          ISC35130
      DO 530 I=1,10                                                   ISC35140
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 530                   ISC35150
      IF (ZMX(I) .GT. 0.0) L2 = I                                     ISC35160
  530 CONTINUE                                                        ISC35170
      GO TO 620                                                       ISC35180
  540 IF (ISW(12) .EQ. -1) GO TO 570                                  ISC35190
      IF (ISW(12) .NE. 1) GO TO 870                                   ISC35200
C     MAXIMUM POINTS HAVE BEEN INPUT BY THE USER                      ISC35210
      L = 0                                                           ISC35220
      IF (NSEASN .EQ. 1.OR.NXPT/PT .LE. 10) GO TO 550                 ISC35230
      L = (K-1)*10                                                    ISC35240
      IF (KK .EQ. 2) L = NSEASN*10                                    ISC35250
  550 L2 = 0                                                          ISC35260
      DO 560 I=1,10                                                   ISC35270
      IXS(I) = NXPNTS+I+L                                             ISC35280
      IYS(I) = NYPNTS+I+L                                             ISC35290
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      ZMX(I) = Z(NXXYY+I+L)                                                    ISC35300
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 560                            ISC35310
      IF (ZMX(I) .GT. 0.0) L2 = I                                              ISC35320
  560 CONTINUE                                                                 ISC35330
      GO TO 620                                                                ISC35340
  570 CONTINUE                                                                 ISC35350
      L = (K-1)*10                                                             ISC35360
      IF (KK .EQ. 2) L = NSEASN*10                                             ISC35370
  580 L2 = 0                                                                   ISC35380
      DO 610 I=1,10                                                            ISC35390
      IXS(I) = IX10(I+L)                                                       ISC35400
      IYS(I) = IY10(I+L)                                                       ISC35410
      IF (IXS(I) .GT. NXPNTS) GO TO 590                                        ISC35420
      JJ = (IYS(I)-1)*NXPNTS+IXS(I)                                            ISC35430
      GO TO 600                                                                ISC35440
  590 JJ = NXXYY+IXS(I)-NXPNTS                                                 ISC35450
  600 ZMX(I) = Z(JJ)                                                           ISC35460
      IF (IXS(I) .EQ. 0.OR.IYS(I) .EQ. 0) GO TO 610                            ISC35470
      IF (ZMX(I) .GT. 0.0) L2 = I                                              ISC35480
  610 CONTINUE                                                                 ISC35490
  620 CONTINUE                                                                 ISC35500
      I = 1                                                                    ISC35510
      IF (ISW(12).EQ.0.OR.IS.EQ.2.OR.NOCOMB(NG).EQ.0) GO TO 640                ISC35520
      J = 2                                                                    ISC35530
  630 I = I+1                                                                  ISC35540
      J = J+1                                                                  ISC35550
      IF (J .GT. NOCOMB(NG)) GO TO 640                                         ISC35560
      J = J+12                                                                 ISC35570
      GO TO 630                                                                ISC35580
  640 L1 = I-1                                                                 ISC35590
      NN = 2                                                                   ISC35600
      IF (LSTILN .EQ. 1.OR.LSTILN .EQ. 2) GO TO 660                            ISC35610
      IF (ISW(16) .EQ. 0) NN = 1                                               ISC35620
  660 CONTINUE                                                                 ISC35630
      ILN = 3                                                                  ISC35640
      L2 = L2+1                                                                ISC35650
      IF (I2 .LE. 1) GO TO 860                                                 ISC35660
      L5 = IBLNK                                                               ISC35670
      L3 = 0                                                                   ISC35680
      DO 850 J=1,L2                                                            ISC35690
      IF (J .EQ. L2) GO TO 680                                                 ISC35700
      I1 = IXS(J)                                                              ISC35710
      I2 = IYS(J)                                                              ISC35720
      IF (I1 .EQ. 0.OR.I2 .EQ. 0) GO TO 850                                    ISC35730
      IF (L3 .NE. 0) GO TO 680                                                 ISC35740
      L3 = 1                                                                   ISC35750
      L = 11                                                                   ISC35760
      IF (LSTILN .EQ. 3.AND.NN .EQ. 2) L = L+L2/2                              ISC35770
      L = L+L1                                                                 ISC35780
      CALL TITLR(L,3,NN)                                                       ISC35790
      LINE = LINE-L                                                            ISC35800
      IF (LINE .GT. 2.AND.LSTILN .EQ. 3) GO TO 670                             ISC35810
      IF (LINE .GT. 2.AND.LSTILN .NE. 0) GO TO 690                             ISC35820
  670 WRITE (6,9030)                                                           ISC35830
      LINE = LINE+1                                                            ISC35840
      CALL HEADNG(KK,K)                                                        ISC35850
      GO TO 690                                                                ISC35860
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  680 CALL TITLR(1,3,0)                                                    ISC35670
      IF (LINE .LE. 3) GO TO 670                                           ISC35680
      GO TO 800                                                            ISC35690
  690 IF (ISW(12) .NE. 0) GO TO 710                                        ISC35700
  700 WRITE (JUNT,9023)                                                    ISC35710
      LINE = LINE+3                                                        ISC35720
      GO TO 790                                                            ISC35730
  710 IF (ISW(12) .GT. 0) GO TO 740                                        ISC35740
      IF (IS .EQ. 2) GO TO 700                                             ISC35750
C     INDIVIDUAL SOURCE CONTRIBUTION TO COMBINED MAXIMUM 10                ISC35760
      IF (NOCOMB(NG) .EQ. 0) GO TO 730                                     ISC35770
      J1 = 1                                                               ISC35780
      J2 = 2                                                               ISC35790
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                              ISC35800
      WRITE (JUNT,9024) (IDSORC(NGT+I),I=J1,J2)                            ISC35810
      LINE = LINE+2                                                        ISC35820
  720 J1 = J2                                                              ISC35830
      J1 = J1+1                                                            ISC35840
      IF (J1 .GT. NOCOMB(NG)) GO TO 780                                    ISC35850
      J2 = J1+11                                                           ISC35860
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                              ISC35870
      LINE = LINE+1                                                        ISC35880
      WRITE (JUNT,9025) (IDSORC(NGT+I),I=J1,J2)                            ISC35890
      LINE = LINE+1                                                        ISC35900
      GO TO 720                                                            ISC35910
  730 WRITE (JUNT,9026)                                                    ISC35920
      LINE = LINE+3                                                        ISC35930
      GO TO 790                                                            ISC35940
  740 IF (NG .EQ. 1) GO TO 760                                             ISC35950
  750 WRITE (JUNT,9027)                                                    ISC35960
      LINE = LINE+3                                                        ISC35970
      GO TO 790                                                            ISC35980
  760 IF (ISW(8) .EQ. 1) GO TO 750                                         ISC35990
      IF (NOCOMB(NG) .EQ. 0) GO TO 770                                     ISC36000
      J1 = 1                                                               ISC36010
      J2 = 2                                                               ISC36020
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                              ISC36030
      WRITE (JUNT,9028) (IDSORC(NGT+I),I=J1,J2)                            ISC36040
      LINE = LINE+2                                                        ISC36050
      GO TO 720                                                            ISC36060
  770 WRITE (JUNT,9029)                                                    ISC36070
      LINE = LINE+3                                                        ISC36080
      GO TO 790                                                            ISC36090
  780 WRITE (JUNT,9030)                                                    ISC36100
      LINE = LINE+1                                                        ISC36110
  790 CONTINUE                                                             ISC36120
      LINE = LINE+6                                                        ISC36130
      WRITE (JUNT,9016) (MSG4(M3+I),I=1,4),(MSG10(I,2),I=M2,M4),(MSG10(I   ISC36140
     1,M5),I=M6,M7),(MSG10(I,M8),I=3,4),(MSG9(I,1),I=1,2),(MSG9(I,M1),I=   ISC36150
     21,2)                                                                 ISC36160
  800 IF (J .EQ. L2) GO TO 830                                             ISC36170
      L5 = IBLNK                                                           ISC36180
      IF (L4 .EQ. 0) GO TO 820                                             ISC36190
      IF (L4 .EQ. 2) GO TO 810                                             ISC36200
C     LABEL FROM GRID SYSTEM USED, DETERMINE IF THIS RECEPTOR IS AN        ISC36210
C     ARBITRARILY SPACED RECEPTOR WITH DIFFERENT UNITS                     ISC36220
      IF (I1 .GT. NXPNTS) L5 = IAST                                        ISC36230
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      GO TO 820                                                          ISC36440
C     LABEL FROM ARBITRARILY SPACED POINTS USED, DETERMINE IF THIS       ISC36450
C     RECEPTOR IS FROM GRID SYSTEM WITH DIFFERENT UNITS                  ISC36460
  810 IF (I1 .LE. MXPNTS) L5 = IAST                                      ISC36470
  820 CONTINUE                                                           ISC36480
      WRITE (JUNT,9017) L5,X(I1),Y(I2),ZMX(J)                            ISC36490
      IF (L5 .NE. IBLNK) L6 = 1                                          ISC36500
      GO TO 850                                                          ISC36510
  830 IF (L4 .EQ. 0) GO TO 850                                           ISC36520
      IF (L6 .EQ. 0) GO TO 850                                           ISC36530
      IF (L4 .EQ. 2) GO TO 840                                           ISC36540
      L6 = 1                                                             ISC36550
      IF (ISW(3) .GE. 2) L6 = 2                                          ISC36560
      WRITE (JUNT,9031) (MSG9(L4,L6),L4=1,2)                             ISC36570
      GO TO 850                                                          ISC36580
  840 L6 = 1                                                             ISC36590
      IF (ISW(2) .GE. 2) L6 = 2                                          ISC36600
      WRITE (JUNT,9031) (MSG9(L4,L6),L4=1,2)                             ISC36610
  850 CONTINUE                                                           ISC36620
  860 CONTINUE                                                           ISC36630
      IF (ISW(16) .EQ. 0) LINE = NLINES                                  ISC36640
  870 CONTINUE                                                           ISC36650
      GO TO 920                                                          ISC36660
  880 CONTINUE                                                           ISC36670
      LINE = NLINES                                                      ISC36680
      ILN = 4                                                            ISC36690
      I1 = -10                                                           ISC36700
  890 I1 = I1+11                                                         ISC36710
      IF (I1 .GT. K) GO TO 910                                           ISC36720
      I2 = I1+10                                                         ISC36730
      IF (I2 .GT. K) I2 = K                                              ISC36740
      I = 0                                                              ISC36750
      DO 900 J=I1,I2                                                     ISC36760
      I = I+1                                                            ISC36770
      IXS(I) = ITSAVE(J)/10                                              ISC36780
  900 IYS(I) = ITSAVE(J)-IXS(I)*10                                       ISC36790
      CALL TITLR(1,4,0)                                                  ISC36800
      WRITE (JUNT,9001) (IXS(J),IYS(J),J=1,I)                            ISC36810
      GO TO 890                                                          ISC36820
  910 K = 0                                                              ISC36830
      LINE = NLINES                                                      ISC36840
  920 CONTINUE                                                           ISC36850
      LSTILN = ILN                                                       ISC36860
      RETURN                                                             ISC36870
 9001 FORMAT (11(1X,I6,3X,I1,1X))                                        ISC36880
 9002 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,23H GAS EXIT TEMPISC36890
     1 (DEG K)=,F7.2,24H, GAS EXIT VEL. (M/SEC)=,F6.2,1H,/58X,19HSTACK DISC36900
     2IAMETER (M)=,F6.3,28H, HEIGHT OF ASSO. BLDG. (M)=,F7.2,10H, WIDTH ISC36910
     30F/58X,16HASSO. BLDG. (M)=,F7.2,21H, WAKE EFFECTS FLAG =,I2)       ISC36920
 9003 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,61H STANDARD DEVIISC36930
     1ATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=,F7.2/58X,59HSTANDAISC36940
     2RD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=,F7.2)        ISC36950
 9004 FORMAT (1X,A1,1X,A1,I7,1X,A4,A2,2F12.2,F7.2,F8.2,19H WIDTH OF AREAISC36960
     1 (M)=,F8.2)                                                       ISC36970
 9005 FORMAT (65X,4(5X,6HSEASON,I2)/67X,4(1PE13.5))                      ISC36980
 9006 FORMAT (58X,2A4,A1,9H CATEGORY,4(3X,6HSEASON,I2,2X))               ISC36990
 9007 FORMAT (67X,I2,7X,4(1PE13.5))                                      ISC37000
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9008 FORMAT (64X,20H- SOURCE STRENGTHS (,10A4,3H) -)                    ISC37010
9009 FORMAT (92X,8H- SEASON,I2,2H -/39X,14HSPEED CATEGORY,31X,24H- STABIISC37020
    1ILITY CATEGORIES -/49X,6(10X,1H(,I1,1H)))                          ISC37030
                                                                        ISC37040
9010 FORMAT (46X,I2,5X,6(1PE13.5))                                      ISC37050
9011 FORMAT (53X,25H- GRID SYSTEM RECEPTORS -/51X,10H- X AXIS (,2A4,11HISC37060
    1, METERS) -/14X,9F13.3)                                            ISC37070
9012 FORMAT (1X,8HY AXIS (,3A4,A3,2H, ,2A4,1H),25X,3H-  ,3A4,A1,3H  -/1ISC37080
    14X,29(4H----)/)                                                    ISC37090
9013 FORMAT (1X,8HY AXIS (,3A4,A3,2H, ,2A4,1H),24X,14H- ELEVATIONS -/14ISC37100
    1X,29(4H----)/)                                                     ISC37110
9014 FORMAT (1X,F13.3,1X,9F13.6)                                        ISC37120
9015 FORMAT (3(1X,F9.1,F11.1,F14.6,5X))                                 ISC37130
9016 FORMAT (51X,1HX,12X,1HY,8X,4A4/47X,23HCOORDINATE   COORDINATE/49X,ISC37140
    1A4,A1,8X,A4,A3/62X,A4,A3/48X,1H(,A4,A2,1H),5X,1H(,A4,A3,1H)/47X,39ISC37150
    2(1H-))                                                             ISC37160
9017 FORMAT (44X,A1,1X,F11.2,2X,F11.2,2X,F14.6)                         ISC37170
9018 FORMAT (82X,26H- PARTICULATE CATEGORIES -)                          ISC37180
9019 FORMAT (78X,7(5X,I2))                                              ISC37190
9020 FORMAT (58X,22HFALL VELOCITY (MPS)   ,7F7.4)                       ISC37200
9021 FORMAT (58X,13HMASS FRACTION,9X,7F7.4)                             ISC37210
9022 FORMAT (58X,22HREFLECTION COEFFICIENT,7F7.4)                       ISC37220
9023 FORMAT (1H0,45X,40H- PROGRAM DETERMINED MAXIMUM 10 VALUES -/)      ISC37230
9024 FORMAT (1H0,19X,78H- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED ISC37240
    1MAXIMUM 10 OF COMBINED SOURCES ,2(I6,1H,))                         ISC37250
9025 FORMAT (20X,2H- ,12(I6,1H,))                                       ISC37260
9026 FORMAT (1H0,23X,83H- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED ISC37270
    1MAXIMUM 10 OF ALL SOURCES COMBINED -/)                             ISC37280
9027 FORMAT (1H0,45X,39H- USER SPECIFIED 10 SPECIAL RECEPTORS -/)       ISC37290
9028 FORMAT (1H0,16X,84H- 10 CONTRIBUTING VALUES TO USER SPECIFIED 10 SISC37300
    1PECIAL RECEPTORS OF COMBINED SOURCES ,2(I6,1H,))                   ISC37310
9029 FORMAT (1H0,20X,89H- 10 CONTRIBUTING VALUES TO USER SPECIFIED 10 SISC37320
    1PECIAL RECEPTORS OF ALL SOURCES COMBINED -/)                       ISC37330
9030 FORMAT (1H )                                                       ISC37340
9031 FORMAT (23X,47H* - MEANS RECEPTORS ARE IN UNITS OF METERS AND ,A4,ISC37350
    1A3,32H, NOT UNITS GIVEN IN THE HEADING)                            ISC37360
9032 FORMAT (1X,8HY AXIS (,3A4,A3,2H, ,2A4,1H),21X,20H- RECEPTOR HEIGHTISC37370
    1S -/14X,29(4H----)/)                                               ISC37380
9033 FORMAT(/,42X,42H- DIRECTION SPECIFIC BUILDING DIMENSIONS -/)       ISC37390
9034 FORMAT(4(' SECTOR   DSBH     DSBW   IWAKE  '),/,4(4(2X,I5,1X,F7.1,ISC37400
    1',',F7.1,',',2X,I5,2X),/))                                         ISC37410
     END                                                                ISC37420
C                                                                       ISC37430
C                                                                       ISC37440
     SUBROUTINE HEADNG(KK,K)                                            ISC37450
C              SUBROUTINE HEADNG (VERSION 87338), PART OF ISCLT.        ISC37460
C    PRINT HEADINGS ON CONCENTRATION (DEPOSITION) TABLES                ISC37470
     COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXYPT,NSEASN,NSPEED,NSTBLE,     ISC37480
    1NSECTOR,ISW(25),UNITS(20),TITLE(20),MOFILE                         ISC37490
     COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES,  ISC37500
    1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC37510
    2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC37520
    300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY,IWAKSW(16)                   ISC37530
     COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),   ISC37540
    1FRQ(20),GAMMA(20),DSBH(16),DSBW(16),QS(6,6,6),ISLG,IWAKE           ISC37550
     COMMON /HEAD/ MSG3(4),MSG4(8),IS,N3,I3,M3,ILN,LSTILN               ISC37560
     DATA IBLNK/1H /                                                    ISC37570
     IC = ICONT(1,NT4)
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      IF (NT4 .EQ. 1) IC = IBLNK                                        ISC37580
      IF (KK .NE. 3) GO TO 30                                           ISC37590
      IF (ILN .NE. 1) GO TO 10                                          ISC37600
      IF (K .LT. 0) THEN                                                ISC37610
      WRITE (JUNT,9013) (ICONT(I,NT4),I=1,3)                            ISC37620
      ELSE                                                              ISC37630
      WRITE (JUNT,9001) (ICONT(I,NT4),I=1,3)                            ISC37640
      ENDIF                                                             ISC37650
      LINE = LINE+2                                                     ISC37660
      GO TO 200                                                         ISC37670
   10 IF (ILN .NE. 2) GO TO 200                                         ISC37680
C                                                                       ISC37690
      M1 = 1                                                            ISC37700
      M2 = 1                                                            ISC37710
      IF (ISW(3) .LE. 1) GO TO 20                                       ISC37720
      M1 = 2                                                            ISC37730
      M2 = 3                                                            ISC37740
   20 CONTINUE                                                          ISC37750
      IF (K .LT. 0) THEN                                                ISC37760
      WRITE (JUNT,9014) (ICONT(I,NT4),I=1,3)                            ISC37770
      ELSE                                                              ISC37780
      WRITE (JUNT,9007) (ICONT(I,NT4),I=1,3)                            ISC37790
      ENDIF                                                             ISC37800
      LINE = LINE+3                                                     ISC37810
      WRITE (JUNT,9008) ((MSG10(I,M1),I=1,2),(MSG10(I,M2),I=1,2),J=1,3),ISC37820
     1((MSG10(I,M2),I=3,4),J=1,3),((MSG9(I,M1),I=1,2),J=1,3)            ISC37830
      LINE = LINE+5                                                     ISC37840
      GO TO 200                                                         ISC37850
   30 IF (ILN .NE. 2) GO TO 40                                          ISC37860
      IF (LINE .GT. 4.AND.LSTILN .EQ. 1) GO TO 180                      ISC37870
   40 IF (ISW(1) .EQ. 2) GO TO 100                                      ISC37880
      IF (IS .EQ. 2) GO TO 60                                           ISC37890
      J2 = NUMS                                                         ISC37900
   50 WRITE (JUNT,9002) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),J2        ISC37910
     1,IC,ICONT(2,NT4)                                                  ISC37920
      LINE = LINE+1                                                     ISC37930
      GO TO 160                                                         ISC37940
   60 IF (NOCOMB(NG) .GT. 0) GO TO 70                                   ISC37950
      WRITE (JUNT,9003) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,       ISC37960
     1ICONT(2,NT4)                                                      ISC37970
      LINE = LINE+1                                                     ISC37980
      GO TO 160                                                         ISC37990
   70 J1 = 2                                                            ISC38000
      IF (J1 .GT. NOCOMB(NG)) J1 = NOCOMB(NG)                           ISC38010
      IF (J1 .GT. 1) GO TO 80                                           ISC38020
      IF (IDSORC(J1+NGT) .LT. 0) GO TO 80                               ISC38030
      J2 = IDSORC(J1+NGT)                                               ISC38040
      GO TO 50                                                          ISC38050
   80 WRITE (JUNT,9010) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,ICONT(2ISC38060
     1,NT4),(IDSORC(I+NGT),I=1,J1)                                      ISC38070
      LINE = LINE+1                                                     ISC38080
   90 J1 = J1+1                                                         ISC38090
      IF (J1 .GT. NOCOMB(NG)) GO TO 160                                 ISC38100
      J2 = J1+16                                                        ISC38110
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                           ISC38120
      WRITE (JUNT,9011) (IDSORC(I+NGT),I=J1,J2)                         ISC38130
      LINE = LINE+1                                                     ISC38140
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      J1 = J2                                                          ISC38150
      GO TO 90                                                         ISC38160
  100 IF (IS .EQ. 2) GO TO 120                                         ISC38170
      J2 = NOMS                                                        ISC38180
  110 WRITE (JUNT,9004) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),J2       ISC38190
     1,IC,ICONT(2,NT4)                                                 ISC38200
      LINE = LINE+1                                                    ISC38210
      GO TO 160                                                        ISC38220
  120 IF (NOCOMB(NG) .GT. 0) GO TO 130                                 ISC38230
      WRITE (JUNT,9005) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,      ISC38240
     1ICONT(2,NT4)                                                     ISC38250
      LINE = LINE+1                                                    ISC38260
      GO TO 160                                                        ISC38270
  130 J1 = 2                                                           ISC38280
      IF (J1 .GT. NOCOMB(NG)) J1 = NOCOMB(NG)                          ISC38290
      IF (J1 .GT. 1) GO TO 140                                         ISC38300
      IF (IDSORC(J1+NGT) .LT. 0) GO TO 140                             ISC38310
      J2 = IDSORC(J1+NGT)                                              ISC38320
      GO TO 110                                                        ISC38330
  140 WRITE (JUNT,9012) MSG3(N3),MSG3(N3+1),(UNITS(I),I=1,10),IC,ICONT(2ISC38340
     1,NT4),(IDSORC(I+NGT),I=1,J1)                                     ISC38350
      LINE = LINE+1                                                    ISC38360
  150 J1 = J1+1                                                        ISC38370
      IF (J1 .GT. NOCOMB(NG)) GO TO 160                                ISC38380
      J2 = J1+16                                                       ISC38390
      IF (J2 .GT. NOCOMB(NG)) J2 = NOCOMB(NG)                          ISC38400
      WRITE (JUNT,9011) (IDSORC(I+NGT),I=J1,J2)                        ISC38410
      LINE = LINE+1                                                    ISC38420
      J1 = J2                                                          ISC38430
      GO TO 150                                                        ISC38440
  160 IF (KK .NE. 1) GO TO 170                                         ISC38450
      WRITE (JUNT,9006) K                                              ISC38460
      LINE = LINE+1                                                    ISC38470
  170 CONTINUE                                                         ISC38480
      IF (ILN .NE. 2) GO TO 200                                        ISC38490
  180 CONTINUE                                                         ISC38500
      M1 = 1                                                           ISC38510
      M2 = 1                                                           ISC38520
      IF (ISW(3) .LE. 1) GO TO 190                                     ISC38530
      M1 = 2                                                           ISC38540
      M2 = 3                                                           ISC38550
  190 WRITE (JUNT,9009) ((MSG4(J+M3),J=1,4),I=1,3)                     ISC38560
      WRITE (JUNT,9008) ((MSG10(I,M1),I=1,2),(MSG10(I,M2),I=1,2),J=1,3),ISC38570
     1((MSG10(I,M2),I=3,4),J=1,3),((MSG9(I,M1),I=1,2),J=1,3)           ISC38580
      LINE = LINE+8                                                    ISC38590
  200 CONTINUE                                                         ISC38600
      NT4 = 2                                                          ISC38610
      RETURN                                                           ISC38620
 9001 FORMAT (34X,51H- GRID SYSTEM RECEPTOR TERRAIN ELEVATIONS (METERS) ISC38630
     1,3A4/)                                                           ISC38640
 9002 FORMAT (9X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,16H) DUISC38650
     1E TO SOURCE ,I6,1X,2A4,3H **)                                    ISC38660
 9003 FORMAT (6X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,28H) FRISC38670
     1OM ALL SOURCES COMBINED ,2A4,3H **)                              ISC38680
 9004 FORMAT (9X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,16H) DUE TISC38690
     1O SOURCE ,I6,1X,2A4,3H **)                                       ISC38700
 9005 FORMAT (8X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,28H) FROM ISC38710
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     1ALL SOURCES COMBINED ,2A4,3H **)                                  ISC38720
 9006 FORMAT (60X,7HSEASON ,I2)                                         ISC38730
 9007 FORMAT (35X,48H- DISCRETE RECEPTOR TERRAIN ELEVATIONS (METERS) ,3AISC38740
     14//1X,3(4X,1HX,9X,1HY,7X,9HELEVATION,9X))                         ISC38750
 9008 FORMAT (1X,3(1X,2A4,1X,2A4,22X)/1X,3(10X,2A4,22X)/1X,3(11H (METERSISC38760
     1) (,A4,A3,1H),21X)/14X,58(2H--)/)                                 ISC38770
 9009 FORMAT (1H0,54X,22H- DISCRETE RECEPTORS -/1X,3(4X,1HX,9X,1HY,6X,3AISC38780
     14,A1,6X))                                                         ISC38790
 9010 FORMAT (3X,3H** ,2A4,29H GROUND LEVEL CONCENTRATION (,10A4,2H) ,2AISC38800
     14,22HFROM COMBINED SOURCES ,2(I6,1H,))                            ISC38810
 9011 FORMAT (3X,3H** ,17(I6,1H,))                                      ISC38820
 9012 FORMAT (3X,3H** ,2A4,26H GROUND LEVEL DEPOSITION (,10A4,2H) ,2A4,2ISC38830
     12HFROM COMBINED SOURCES ,2(I6,1H,))                               ISC38840
 9013 FORMAT (35X,49H- GRID SYSTEM ELEVATED RECEPTOR HEIGHTS (METERS) ,3ISC38850
     1A4/)                                                              ISC38860
 9014 FORMAT (36X,46H- DISCRETE ELEVATED RECEPTOR HEIGHTS (METERS) ,3A4/ISC38870
     1/1X,3(4X,1HX,9X,1HY,10X,6HHEIGHT,9X))                             ISC38880
      END                                                               ISC38890
C                                                                       ISC38900
C                                                                       ISC38910
      SUBROUTINE TITLR(N,L,LL)                                          ISC38920
C                SUBROUTINE TITLR (VERSION 87338), PART OF ISCLT.       ISC38930
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,    ISC38940
     1NSCTOR,ISW(25),UNITS(20),TITLE(20),NOFILE                         ISC38950
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC38960
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC38970
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC38980
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXXY,IWAKSW(16)                  ISC38990
      DATA IPAGE/0/                                                     ISC39000
      IF (LL .EQ. 1) GO TO 10                                           ISC39010
      LINE = LINE+N                                                     ISC39020
      IF (LINE .LT. NLINES) GO TO 70                                    ISC39030
   10 IPAGE = IPAGE+1                                                   ISC39040
      WRITE (JUNT,9001) TITLE,IPAGE                                     ISC39050
      LINE = 2                                                          ISC39060
   20 GO TO (30,40,50,60),L                                             ISC39070
   30 WRITE (JUNT,9002) (ICONT(I,NT2),I=1,3)                            ISC39080
      IF (ISW(8) .EQ. 2) NT2 = 2                                        ISC39090
      LINE = LINE+8+N                                                   ISC39100
      GO TO 80                                                          ISC39110
   40 WRITE (JUNT,9003) (ICONT(I,NT1),I=1,3)                            ISC39120
      NT1 = 2                                                           ISC39130
      LINE = LINE+2+N                                                   ISC39140
      GO TO 80                                                          ISC39150
   50 LINE = LINE+N                                                     ISC39160
      GO TO 80                                                          ISC39170
   60 WRITE (JUNT,9004) (ICONT(I,NT3),I=1,3)                            ISC39180
      NT3 = 2                                                           ISC39190
      LINE = LINE+3+N                                                   ISC39200
      GO TO 80                                                          ISC39210
   70 IF (LL .NE. 2) GO TO 80                                           ISC39220
      LINE = LINE-N                                                     ISC39230
      GO TO 20                                                          ISC39240
   80 CONTINUE                                                          ISC39250
      RETURN                                                            ISC39260
 9001 FORMAT (1H1,11H***** ISCLT ,13(1H*),1X,20A4,1X, 8(1H*),6H PAGE ,I6,ISC39270
     15H *****/)                                                        ISC39280
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9002 FORMAT (/50X,20H- SOURCE INPUT DATA ,3A4//23H C T SOURCE SOURCE   ISC39290
    1  ,1HX,11X,1HY,6X,16HEMISSION  BASE //58H A A NUMBER  TYPE  COORDIISC39300
    2NATE  COORDINATE  HEIGHT  ELEV- /,18X,36H- SOURCE DETAILS DEPENDINISC39310
    3G ON TYPE -/4H R P,18X,3H(M),9X,3H(M),8X,3H(M),3X,7HATION //4H D EISC39320
    4,48X,6H(M)  //1X,64(2H--))                                       ISC39330
9003 FORMAT (40X,19H- ISCLT INPUT DATA ,3A4/)                         ISC39340
9004 FORMAT (40X,36H- SUMMARY OF SOURCES OUTPUT TO TAPE ,3A4//11(12H NUISC39350
    1MBER/TYPE))                                                      ISC39360
     END                                                              ISC39370
C                                                                     ISC39380
C                                                                     ISC39390
      SUBROUTINE SUMMER(AR1,AR2,L1)                                   ISC39400
C                SUBROUTINE SUMMER (VERSION 87338), PART OF ISCLT.    ISC39410
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC39420
     1ICARD,NXPSS,NYPSS,MUNT,NUNIT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC39430
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC39440
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY,IWAKSW(16)                ISC39450
      DIMENSION AR1(1),AR2(1)                                         ISC39460
      IF (L1 .LT. 0) GO TO 40                                         ISC39470
      IF (L1 .EQ. 1) GO TO 20                                         ISC39480
      DO 10 I=1,NXXYYP                                                ISC39490
   10 AR1(I) = AR1(I)+AR2(I)                                          ISC39500
      GO TO 60                                                        ISC39510
   20 DO 30 I=1,NXXYYP                                                ISC39520
   30 AR1(I) = AR2(I)                                                 ISC39530
      GO TO 60                                                        ISC39540
   40 DO 50 I=1,NXXYYP                                                ISC39550
   50 AR1(I) = AR1(I)*XSEA                                            ISC39560
   60 RETURN                                                          ISC39570
      END                                                             ISC39580
C                                                                     ISC39590
C                                                                     ISC39600
      SUBROUTINE MXIMUM(IXS,IYS,ZMX,Z)                                ISC39610
C                  SUBROUTINE MXIMUM (VERSION 87338), PART OF ISCLT.  ISC39620
      COMMON /DIM/ NSOURC,NXPNTS,NYPNTS,NXWYPT,NSEASN,NSPEED,NSTBLE,  ISC39630
     1NSCTOR,ISH(25),UNIT3(20),TITLE(20),NOFILE                       ISC39640
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),IFLG3,LINE,NLINES, ISC39650
     1ICARD,NXPSS,NYPSS,MUNT,NUNIT,ICONT(3,2),ITSAVE(572),NT1,NT2,NT3,NT4ISC39660
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC39670
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY,IWAKSW(16)                ISC39680
      DIMENSION IXS(1),IYS(1),ZMX(1),Z(1)                             ISC39690
      DO 10 I=1,10                                                    ISC39700
      IXS(I) = 0                                                      ISC39710
      IYS(I) = 0                                                      ISC39720
   10 ZMX(I) = 0.0                                                    ISC39 30
      N = 10                                                          ISC39740
      J4 = 1                                                          ISC39750
      JJ = 0                                                          ISC39760
   20 JJ = JJ+1                                                       ISC39770
      IF (JJ .GT. NYPNTS) GO TO 40                                    ISC39780
      JJJ = (JJ-1)*NXPNTS                                             ISC39790
      II = 0                                                          ISC39800
   30 II = II+1                                                       ISC39810
      IF (II .GT. NXPNTS) GO TO 20                                    ISC39820
      I3 = JJJ+II                                                     ISC39830
      GO TO 60                                                        ISC39840
   40 IF (NXWYPT .LE. 0) GO TO 110                                    ISC39850
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                                                                      ISC39860
      J4 = 2                                                          ISC39870
      IJ = NXXYY                                                      ISC39880
   50 I' = IJ+1                                                       ISC39890
      IF (IJ .GT. NXXYYP) GO TO 110                                   ISC39900
      JJ = IJ+NYPSS                                                   ISC39910
      II = IJ+NXPSS                                                   ISC39920
   60 CONTINUE                                                        ISC39930
      IF (Z(IJ) .LE. ZMX(N)) GO TO 100                                ISC39940
      L = 0                                                           ISC39950
   70 L = L+1                                                         ISC39960
      IF (L .GT. N) GO TO 100                                         ISC39970
      IF (Z(IJ) .LE. ZMX(L)) GO TO 70                                 ISC39980
      M = N+1                                                         ISC39990
   80 M = M-1                                                         ISC40000
      IF (M .LE. L) GO TO 90                                          ISC40010
      IXS(M) = IXS(M-1)                                               ISC40020
      IYS(M) = IYS(M-1)                                               ISC40030
      ZMX(M) = ZMX(M-1)                                               ISC40040
      GO TO 80                                                        ISC40050
   90 ZMX(L) = Z(IJ)                                                  ISC40060
      IXS(L) = II                                                     ISC40070
      IYS(L) = JJ                                                     ISC40080
  100 GO TO (30,50),J4                                                ISC40090
  110 CONTINUE                                                        ISC40100
      RETURN                                                          ISC40110
      END                                                             ISC40120
C                                                                     ISC40130
C                                                                     ISC40140
      SUBROUTINE CHECKR(NN,NO)                                        ISC40150
C                 SUBROUTINE CHECKR (VERSION 87338), PART OF ISCLT.   ISC40160
      COMMON /REST/ IUNT,JUNT,NXXYY,NXXYYP,ISTBLE(6),T'LG3,LINE,NL'HES, ISC40170
     1ICARD,NXPSS,NYPSS,MUNT,NUNT,ICONT(3,2),ITSAVE(5/2),NT1,NT2,N:3,NT4ISC40180
     2,MSG7(4,3),MSG8(2),MSG9(2,2),MSG10(4,3),NGROUP,NOCOMB(20),IDSORC(2ISC40190
     300),IEND,XSEA,ISAVSO(300),NG,NGT,NXWY,IWAKSW(16)                ISC40200
      COMMON /SORC/ NUMS,TYPE,DX,DY,H,ZS,TS,VEL,D,HB,BW,BL,NVS,VS(20),  ISC40210
     1FRQ(20),GAMMA(20),DSBW(16),DSBW(16),Q(6,6,4),QFLG,WAKE           ISC40220
      IF (NN .GT. 0) GO TO 10                                         ISC40230
      JJ = NOCOMB(NG)                                                 ISC40240
      II = NGT                                                        ISC40250
      GO TO 30                                                        ISC40260
   10 II = 0                                                          ISC40270
      I = 0                                                           ISC40280
   20 I = I+1                                                         ISC40290
      IF (I .GT. NN) GO TO 60                                         ISC40300
      JJ = NOCOMB(I)                                                  ISC40310
   30 IF (JJ .EQ. 0) GO TO 70                                         ISC40320
      DO 50 J=1,JJ                                                    ISC40330
      IF (IDSORC(J+II) .GE. 0) GO TO 40                               ISC40340
      IF (!NUMS .GT. IABS(IDSORC(J+II))) GO TO 50                     ISC40350
      IF (J .EQ. 1) GO TO 70                                          ISC40360
      IF (IDSORC(J+II-1) .GE. 0.AND.NUMS .LT. IDSORC(J+II-1)) GO TO 50 ISC40370
      GO TO 70                                                        ISC40380
   40 IF (NUMS .EQ. IDSORC(J+II)) GO TO 70                            ISC40390
   50 CONTINUE                                                        ISC40400
      II = II+JJ                                                      ISC40410
      IF (NN .GT. 0) GO TO 20                                         ISC40420
   60 NO = 0
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      GO TO 80                                                          ISC40430
   70 CONTINUE                                                          ISC40440
      NO = 1                                                            ISC40450
   80 RETURN                                                            ISC40460
      END                                                               ISC40470
C                                                                       ISC40480
C                                                                       ISC40490
      SUBROUTINE DISTR                                                  ISC40500
C               SUBROUTINE DISTR (VERSION 87338), PART OF ISCLT.        ISC40510
C     CALC DISTANCE BETWEEN SOURCE AND RECEPTOR, DETERMINES IF RECEPTOR ISC40520
C     IS IN THE CALCULATION SECTOR OR NOT AND CALCULATES THE SMOOTHING  ISC40530
C     TERM                                                              ISC40540
      COMMON /DIST/ XB,YB,XYP,THN,TR,TRI,ARG,RP,RPI                     ISC40550
      ARG = -1.0                                                        ISC40560
      XF = XB*XYP                                                       ISC40570
      F = XF*THN                                                        ISC40580
C     DETERMINE IF INSIDE CALC SECTOR. IF NOT THEN NO CALC              ISC40590
      IF (ABS(YB) .GE. F) GO TO 10                                      ISC40600
C     CALC RADIAL DISTANCE BETWEEN SOURCE AND RECEPTOR                  ISC40610
      RP = SQRT(XF*XF+YB*YB)                                            ISC40620
      RPI = 1.0/RP                                                      ISC40630
C     CALC SMOOTHING TERM                                               ISC40640
      F = XF*RPI                                                        ISC40650
      IF (F .GT. 1.0) F = 1.0                                           ISC40660
      F = ABS(TR-ACOS(F))*TRI                                           ISC40670
      ARG = F*RPI                                                       ISC40680
   10 RETURN                                                            ISC40690
      END                                                               ISC40700
C                                                                       ISC40710
C                                                                       ISC40720
      FUNCTION FUNCT(X,IST,ISW9)                                        ISC40730
C                     FUNCTION FUNCT (VERSION 87338), PART OF ISCLT.    ISC40740
C     CALCULATES AVERAGE B FOR VERTICAL TERM OF DEPOSITION EQUATION     ISC40750
C     MODIFIED TO OPTIONALLY USE BRIGGS URBAN/MCELROY-POOLER 'B' VALUES ISC40760
      DIMENSION BU(38)                                                  ISC40770
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC40780
     *8),IA(7),JA(6),DST(33),IDP                                        ISC40790
      DATA BU/ 1.05481,                                                 ISC40800
     1        1.05481,1.07397,1.09147,1.10755,1.12880,1.15459,          ISC40810
     *    1.27573,1.39840,  1.06277,1.11120,1.19443,  1.0,              ISC40820
     *    .97423,.92683,.82729,.69004,.50298,.54401,                    ISC40830
     *   .89450,.89450,.77376,.66095,.59632,.54890,.52290,.51173,       ISC40840
     *    .50737,  .91156,.81821,.72180,.66096,.60730,.56473,           ISC40850
     *    .53115,.51551,.50788,.50452/                                  ISC40860
      XD = X*.001                                                       ISC40870
      M = IA(IST)+1                                                     ISC40880
      L = IA(IST+1)                                                     ISC40890
      IF (IST .EQ. 1) L = L-1                                           ISC40900
      I = JA(IST)                                                       ISC40910
      IF (ISW9 .NE. 4) AV=BS(I)                                         ISC40920
      IF (ISW9 .EQ. 4) AV=BU(I)                                         ISC40930
      DO 10 K=M,L                                                       ISC40940
      IF (XD .LE. DST(K-1)) GO TO 20                                    ISC40950
      I = I+1                                                           ISC40960
      IF (ISW9 .NE. 4) AV = AV + BS(I)                                  ISC40970
      IF (ISW9 .EQ. 4) AV = AV + BU(I)                                  ISC40980
   10 CONTINUE                                                          ISC40990
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   20 FUNCT = AV/FLOAT(I-JA(IST)+1)                                      ISC41000
      RETURN                                                             ISC41010
      END                                                                ISC41020
C                                                                        ISC41030
C                                                                        ISC41040
      SUBROUTINE VERTC1                                                  ISC41050
C                SUBROUTINE VERTC1 (VERSION 87338), PART OF ISCLT.       ISC41060
C     CALCULATES THE VERTICAL TERM FOR THE CONCENTRATION EQUATION        ISC41070
      COMMON /VERT/SIGZI,SIGZ,HM,H,V,VSROU,BA                            ISC41080
      DATA SQ2PO2/1.253314137/                                           ISC41090
      V = 0.0                                                            ISC41100
      IF (SIGZI .GE. 0.0) GO TO 30                                       ISC41110
      A = SIGZ/HM                                                        ISC41120
      IF (A .GE. 1.6) GO TO 20                                           ISC41130
      C = H*H*SIGZI                                                      ISC41140
      IF (B .LT. -30.0) GO TO 30                                         ISC41150
      V = EXP(B)                                                         ISC41160
      B = 0.0                                                            ISC41170
   10 B = B+2.0                                                          ISC41180
      IF (B .GT. 6.0) GO TO 20                                           ISC41190
      TR = B*HM                                                          ISC41200
      TS = (TR-H)**2*SIGZI                                               ISC41210
      IF (TS .LT. -10.0) GO TO 30                                        ISC41220
      TR = (TR+H)**2*SIGZI                                               ISC41230
      V = V+EXP(TS)+EXP(TR)                                              ISC41240
      GO TO 10                                                           ISC41250
   20 V = SQ2PO2*A                                                       ISC41260
   30 CONTINUE                                                           ISC41270
      RETURN                                                             ISC41280
      END                                                                ISC41290
C                                                                        ISC41300
      SUBROUTINE VRTC1R(RHT)                                             ISC41310
C                SUBROUTINE VRTC1R (VERSION 87338), PART OF ISCLT       ISC41320
C     CALCULATES THE VERTICAL TERM FOR THE CONCENTRATION EQUATION WHEN   ISC41330
C     RECEPTORS ARE ABOVE LOCAL GROUND LEVEL.                            ISC41340
      COMMON /VERT/SIGZI,SIGZ,HM,H,V,VSROU,BA                            ISC41350
      DATA SQ2PO2/1.253314137/                                           ISC41360
      V = 0.0                                                            ISC41370
      H1 = RHT-H                                                         ISC41380
      H2 = RHT+H                                                         ISC41390
      IF (SIGZI .GE. 0.0) GO TO 30                                       ISC41400
      A = SIGZ/HM                                                        ISC41410
      IF (A .GE. 1.6) GO TO 20                                           ISC41420
      B = H1*H1*SIGZI                                                    ISC41430
      C = H2*H2*SIGZI                                                    ISC41440
      IF (B .LT. -30.0) GO TO 30                                         ISC41450
      V = EXP(B)+EXP(C)                                                  ISC41460
      B = 0.0                                                            ISC41470
   10 B = B+2.0                                                          ISC41480
      IF (B .GT. 6.0) GO TO 20                                           ISC41490
      TR = B*HM                                                          ISC41500
      TS = (TR-H1)**2*SIGZI                                              ISC41510
      IF (TS .LT. -10.0) GO TO 30                                        ISC41520
      TT = (TR+H1)**2*SIGZI                                              ISC41530
      TQ = (TR-H2)**2*SIGZI                                              ISC41540
      TR = (TR+H2)**2*SIGZI                                              ISC41550
      V = V+EXP(TS)+EXP(TR)+EXP(TQ)+EXP(TT)                              ISC41560
```

```
      GO TO 10                                                          ISC41570
   20 V = SQ2PO2*A                                                      ISC41580
   30 CONTINUE                                                          ISC41590
      V = V*0.5                                                         ISC41600
      RETURN                                                            ISC41610
      END                                                               ISC41620
C                                                                       ISC41630
      SUBROUTINE VERTC2(GAMMA,RHT)                                      ISC41640
C                 SUBROUTINE VERTC2 (VERSION 87338), PART OF ISCLT.     ISC41650
      COMMON /VERT/ SIGZI,SIGZ,HM,H,V,VSROU,BA                          ISC41660
C     CALCULATES THE VERTICAL TERM IN THE CONCENTRATION EQUATION WHEN   ISC41670
C     DEPOSITION IS OCCURRING                                           ISC41680
      V = 0.0                                                           ISC41690
      IF (SIGZI .GE. 0.0) GO TO 60                                      ISC41700
      H1 = -H+VSROU-RHT                                                 ISC41710
      H2 = H-VSROU-RHT                                                  ISC41720
      A = H2*H2*SIGZI                                                   ISC41730
      IF (A .LT. -40.0) GO TO 60                                        ISC41740
      B = H1*H1*SIGZI                                                   ISC41750
      IF (B .LT. -40.0) GO TO 10                                        ISC41760
      V = EXP(B)                                                        ISC41770
   10 IF (GAMMA .LE. 0.0) GO TO 20                                      ISC41780
      V = V+EXP(A)*GAMMA                                                ISC41790
   20 A = 1.0                                                           ISC41800
      B = GAMMA                                                         ISC41810
      C = B*B                                                           ISC41820
      D = 0.0                                                           ISC41830
   30 D = D+2.0                                                         ISC41840
      TR = D*HM                                                         ISC41850
      TS = (TR-H2)**2*SIGZI                                             ISC41860
      IF (D .LE. 2.0.AND.TS .GT. -40.0) GO TO 40                        ISC41870
      IF (TS .LT. -10.0) GO TO 60                                       ISC41880
   40 VL = A*EXP(TS)                                                    ISC41890
      IF (GAMMA .LE. 0.0) GO TO 50                                      ISC41900
      TT = (TR+H1)**2*SIGZI                                             ISC41910
      TQ = (TR-H1)**2*SIGZI                                             ISC41920
      TR = (TR+H2)**2*SIGZI                                             ISC41930
      VL = VL+B*(EXP(TT)+EXP(TQ))+C*EXP(TR)                             ISC41940
      IF (VL .LE. V*1.0E-6) GO TO 50                                    ISC41950
      V = V+VL                                                          ISC41960
      A = B                                                             ISC41970
      B = C                                                             ISC41980
      C = C*GAMMA                                                       ISC41990
      GO TO 30                                                          ISC42000
   50 V = V+VL                                                          ISC42010
   60 CONTINUE                                                          ISC42020
      RETURN                                                            ISC42030
      END                                                               ISC42040
C                                                                       ISC42050
C                                                                       ISC42060
      SUBROUTINE VERTC3(GAMMA)                                          ISC42070
C                 SUBROUTINE VERTC3 (VERSION 87338), PART OF ISCLT.     ISC42080
      COMMON /VERT/ SIGZI,SIGZ,HM,H,V,VSROU,BA                          ISC42090
      V = 0.0                                                           ISC42100
      IF (SIGZI .GE. 0.0) GO TO 40                                      ISC42110
      H1 = H-VSROU                                                      ISC42120
      A = H1*H1*SIGZI                                                   ISC42130
```

```
      IF (A .LT. -40.0) A = -40.0                                          ISC42140
      V = V+(BA*H1+VSROU)*EXP(A)                                           ISC42150
      A = 1.0                                                              ISC42160
      B = GAMMA                                                            ISC42170
      C = 0.0                                                              ISC42180
   10 C = C+2.0                                                            ISC42190
      TR = C*HH                                                            ISC42200
      TS = (TR-H1)                                                         ISC42210
      TR = (TR+H1)                                                         ISC42220
      TT = TS*TS*SIGZI                                                     ISC42230
      TQ = TR*TR*SIGZI                                                     ISC42240
      IF (C .LE. 2.0) GO TO 20                                             ISC42250
      IF (TT .LT. -10.0.AND.TQ .LT. -10.0) GO TO 40                        ISC42260
   20 IF (TT .LT. -40.0) TT = -40.0                                        ISC42270
      IF (TQ .LT. -40.0) TQ = -40.0                                        ISC42280
      VL = A*(BA*TS-VSROU)*EXP(TT)+B*(BA*TR+VSROU)*EXP(TQ)                 ISC42290
      IF (GAMMA .LE. 0.0) GO TO 30                                         ISC42300
      IF (VL .LE. V*1.0E-6) GO TO 30                                       ISC42310
      V = V+VL                                                             ISC42320
      A = B                                                                ISC42330
      B = B*GAMMA                                                          ISC42340
      GO TO 10                                                             ISC42350
   30 V = V+VL                                                             ISC42360
   40 IF(V.LT.0.0) V=0.0                                                   ISC42370
      RETURN                                                               ISC42380
      END                                                                  ISC42390
C                                                                          ISC42400
      FUNCTION SIGMAZ(XP,IST)                                              ISC42410
C                     FUNCTION SIGMAZ (VERSION 87338), PART OF ISCLT.      ISC42420
C     CALCULATES THE STANDARD DEVIATION OF THE VERTICAL CONCENTRATION       ISC42430
C     DISTRIBUTION                                                         ISC42440
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC42450
     18),IA(7),JA(6),DST(33),IDP                                           ISC42460
C                                                                          ISC42470
      XD = XP*.001                                                         ISC42480
      K = 13                                                               ISC42490
      IF (IST .EQ. 3) GO TO 30                                             ISC42500
      M = IA(IST)                                                          ISC42510
      L = IA(IST+1)-1                                                      ISC42520
      IF (IST .EQ. 1.AND.IDP .NE. 0) L = L-1                               ISC42530
      DO 10 K=M,L                                                          ISC42540
      IF (XD .LE. DST(K)) GO TO 20                                         ISC42550
   10 CONTINUE                                                             ISC42560
      K = L+1                                                              ISC42570
   20 K = K-M+JA(IST)                                                      ISC42580
   30 SIGMAZ = AS(K)*XD**BS(K)                                             ISC42590
      IF (IST .GT. 3.OR.IDP .NE.0) GO TO 40                                ISC42600
      IF (SIGMAZ .GT. 5000.0) SIGMAZ = 5000.0                              ISC42610
   40 CONTINUE                                                             ISC42620
      RETURN                                                               ISC42630
      END                                                                  ISC42640
C                                                                          ISC42650
      FUNCTION VIRTZ(SIGZO,IST,X,HB10)                                     ISC42660
C                     FUNCTION VIRTZ (VERSION 87338), PART OF ISCLT.       ISC42670
C     CALCULATES VERTICAL VIRTUAL DISTANCE                                 ISC42680
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC42690
     18),IA(7),JA(6),DST(33),IDP                                           ISC42700
```

```
C                                                                       ISC42710
      XD = X*.001                                                       ISC42720
      XE = HB10*.001                                                    ISC42730
      K = 13                                                            ISC42740
      IF (IST .EQ. 3) GO TO 30                                          ISC42750
      M = IA(IST)                                                       ISC42760
      L = IA(IST+1)-1                                                   ISC42770
      IF (IST .EQ. 1) L = L-1                                           ISC42780
      DO 10 K=M,L                                                       ISC42790
      IF (XD .LE. DST(K)) GO TO 20                                      ISC42800
   10 CONTINUE                                                          ISC42810
      K = L+1                                                           ISC42820
   20 KK = K                                                            ISC42830
      K = K-M+JA(IST)                                                   ISC42840
   30 VIRTZ = (SIGZO*ASI(K))**BSI(K)-XE                                 ISC42850
      IF (VIRTZ .LT. 0.0) VIRTZ = 0.0                                   ISC42860
      IF (IST.EQ.3.OR.KK.GT.L.OR.VIRTZ+XD.LE.DST(KK)) GO TO 40          ISC42870
      K = KK+1                                                          ISC42880
      GO TO 20                                                          ISC42890
   40 VIRTZ = VIRTZ*1.0E3                                               ISC42900
      RETURN                                                            ISC42910
      END                                                               ISC42920
C                                                                       ISC42930
      FUNCTION VIRTY(SIGYO,IST)                                         ISC42940
C                     FUNCTION VIRTY (VERSION 87338), PART OF ISCLT.    ISC42950
C     CALCULATES LATERAL VIRTUAL DISTANCE                               ISC42960
      COMMON /FUNCS/ AS(38),BS(38),PS(6),QS(6),CS(6),DS(6),ASI(38),BSI(3ISC42970
     18),IA(7),JA(6),DST(33),IDP                                        ISC42980
      VIRTY = (SIGYO*PS(IST))**QS(IST)*1.0E3                            ISC42990
      RETURN                                                            ISC43000
      END                                                               ISC43010
C                                                                       ISC43020
      SUBROUTINE URBNYZ (X,KST,SY,SZ)                                   ISC43030
C** SUBROUTINE URBNYZ (VERSION 87338) PART OF ISCLT                     ISC43040
C     BRIGGS URBAN PARAMETERS SIGMA-Y,SIGMA-Z                           ISC43050
C     SIGMA-Y,Z (IN METERS) FROM PASQUILL STABILITY CLASS (KST)         ISC43060
C     AND DISTANCE FROM SOURCE, XM, IN METERS.                          ISC43070
      XM=X                                                              ISC43080
      GO TO (20,20,30,40,50,50), KST                                    ISC43090
   20 SY=0.32*XM/SQRT(1.+0.0004*XM)                                     ISC43100
      SZ=0.24*XM*SQRT(1.+0.001*XM)                                      ISC43110
      GO TO 60                                                          ISC43120
   30 SY=0.22*XM/SQRT(1.+0.0004*XM)                                     ISC43130
      SZ=0.2*XM                                                         ISC43140
      GO TO 60                                                          ISC43150
   40 SY=0.16*XM/SQRT(1.+0.0004*XM)                                     ISC43160
      SZ=0.14*XM/SQRT(1.+0.0003*XM)                                     ISC43170
      GO TO 60                                                          ISC43180
   50 SY=0.11*XM/SQRT(1.+0.0004*XM)                                     ISC43190
      SZ=0.08*XM/SQRT(1.+0.0015*XM)                                     ISC43200
   60 IF(SZ .GT. 5000.) SZ=5000.                                        ISC43210
      RETURN                                                            ISC43220
      END                                                               ISC43230
      FUNCTION XVY (SYO,KST)                                            ISC43240
C** FUNCTION XVY (VERSION 87338) PART OF ISCLT                          ISC43250
C        XVY CALCULATES THE VIRTUAL DISTANCE NECESSARY TO               ISC43260
C        ACCOUNT FOR THE INITIAL CROSSWIND DISPERSION.                  ISC43270
```

```
C        BASED ON BRIGGS URBAN DISPERSION COEFFICIENTS                  ISC43280
C     VALUE RETURNED IS IN METERS.                                      ISC43290
      DIMENSION A(6)                                                    ISC43300
      DATA A/.32,.32,.22,.16,.11,.11/                                   ISC43310
      DATA B/.0004/                                                     ISC43320
C** DIRECT SOLUTION FOR URBAN DISPERSION                                ISC43330
70    XVY=(B*SYO**2+SQRT(B**2*SYO**4+4.*A(KST)**2*SYO**2))/             ISC43340
     *(2.*A(KST)**2)                                                    ISC43350
      RETURN                                                            ISC43360
       END                                                              ISC43370
      FUNCTION XVZ (SZO,KST)                                            ISC43380
C** FUNCTION XVZ (VERSION 87338) PART OF ISCLT                          ISC43390
C        XVZ CALCULATES THE VIRTUAL DISTANCE NECESSARY                  ISC43400
C        TO ACCOUNT FOR THE INITIAL VERTICAL DISPERSION.                ISC43410
C        BASED ON BRIGGS URBAN DISPERSION COEFFICIENTS                  ISC43420
C     VALUE RETURNED IS IN METERS.                                      ISC43430
      DIMENSION C(6),D(6)                                               ISC43440
      DATA C /1.E06,1.E06,.20,.14,.08,.08/                              ISC43450
      DATA D /1.E09,1.E09,0.,.0003,.0015,.0015/                         ISC43460
C     DIRECT SOLUTION FOR URBAN DISPERSION                              ISC43470
170   GO TO (180,180,190,200,200,200), KST                              ISC43480
C     SOLUTION TO THE CUBIC EQUATION                                    ISC43490
C     FROM CRC MATHEMATICAL TABLES                                      ISC43500
C     STABILITY A&B (180)                                               ISC43510
180   A=-C(KST)/3.                                                      ISC43520
      B=(2./27.-(SZO/240.)**2)*D(KST)                                   ISC43530
      S=B**2/4.+A**3/27.                                                ISC43540
      IF(S .LT. 0.) GO TO 185                                           ISC43550
      S=SQRT(S)                                                         ISC43560
      E=1./3.                                                           ISC43570
      BA=(-B/2.+S)**E                                                   ISC43580
      BB=(-B/2.-S)**E                                                   ISC43590
      Y=BA+BB                                                           ISC43600
182   XVZ=Y-1000./3.                                                    ISC43610
      RETURN                                                            ISC43620
185   CS=(SZO/240.)**2*27./2.-1.                                        ISC43630
      TH=ACOS(CS)/3.                                                    ISC43640
      Y=2./3.*COS(TH)*1.E03                                             ISC43650
      GO TO 182                                                         ISC43660
C     STABILITY C(190)                                                  ISC43670
190   XVZ=SZO/C(KST)                                                    ISC43680
      RETURN                                                            ISC43690
C     STABILITY D,E,&F (200)                                            ISC43700
200   XVZ=(D(KST)*SZO**2+SQRT(D(KST)**2*SZO**4+4.*C(KST)**2             ISC43710
     **SZO**2))/(2.*C(KST)**2)                                          ISC43720
      RETURN                                                            ISC43730
       END                                                              ISC43740
C                                                                       ISC43750
       SUBROUTINE MPR1LT(KST,TS,TEMP,F,D,VS,UPL,DELH,DTHDZ,DISTF)       ISC43760
C     SUBROUTINE MPR1 (VERSION 87338) PART OF ISCLT                     ISC43770
C     MAJOR PORTIONS OF THIS CODE CAME FROM THE                         ISC43780
C     MPTER MODEL.                                                      ISC43790
C        PLUME RISE CALCULATION                                         ISC43800
      DELT=TS-TEMP                                                      ISC43810
      IF (KST.GT.4) GO TO 70                                            ISC43820
C        PLUME RISE FOR UNSTABLE CONDITIONS                             ISC43830
      IF (TS.LT.TEMP) GO TO 80                                          ISC43840
```

```
      IF (F.GE.55.) GO TO 60                                                ISC43850
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F<55)            ISC43860
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OF    ISC43870
C        BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F<55.                ISC43880
                                                                            ISC43890
      DTHB=0.0297*TS*VS**0.33333/D**0.66667                                 ISC43900
      IF (DELT.LT.DTHB) GO TO 80                                            ISC43 10
C        DISTANCE OF FINAL BUOYANT RISE(0.049 IS 14*3.5/1000)               ISC43920
C        BRIGGS(1971) EQN. 7,F<55, AND DIST TO FINAL RISE IS 3.5 XSTAR      ISC43930
C        DISTF IN KILOMETERS                                                ISC43940
      DISTF=0.049*F**0.625                                                  ISC43950
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F<55.     ISC43960
      DELH=21.425*F**0.75/UPL                                               ISC43970
      GO TO 100                                                             ISC43980
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(F>55)            ISC43990
C        FOUND BY EQUATING BRIGGS(1969) EQ 5.2, P.59 WITH COMBINATION OF    ISC44000
C         BRIGGS(1971) EQUATIONS 6 AND 7, PAGE 1031 FOR F>55.               ISC44010
   60 DTHB=0.00575*TS*VS**0.66667/D**0.33333                                ISC44020
      IF (DELT.LT.DTHB) GO TO 80                                            ISC44030
C        DISTANCE OF FINAL BUOYANT RISE (0.119 IS 34*3.5/1000)              ISC44040
C        BRIGGS(1971) EQN. 7, F>55, AND DIST TO FINAL RISE IS 3.5 XSTAR.    ISC44050
C        DISTF IN KILOMETERS                                                ISC44060
      DISTF=0.119*F**0.4                                                    ISC44070
C        COMBINATION OF BRIGGS(1971) EQNS. 6 AND 7, PAGE 1031 FOR F>55.     ISC44080
      DELH=38.71*F**0.6/UPL                                                 ISC44090
      GO TO 100                                                             ISC44100
C        PLUME RISE FOR STABLE CONDITIONS.                                  ISC44110
   70 S=9.80616*DTHDZ/TEMP                                                  ISC44120
      IF (TS.LT.TEMP) GO TO 90                                              ISC44130
C        DETERMINE DELTA-T FOR BUOYANCY-MOMENTUM CROSSOVER(STABLE)          ISC44140
C        FOUND BY EQUATING BRIGGS(1975) EQ 59, P. 96 FOR STABLE BUOYANCY    ISC44150
C        RISE WITH BRIGGS(1969) EQ 4.28, P. 59 FOR STABLE MOMENTUM RISE.    ISC44160
      DTHB=0.019582*TEMP*VS*SQRT(S)                                         ISC44170
      IF (DELT.LT.DTHB) GO TO 90                                            ISC44180
C        STABLE BUOYANT RISE FOR WIND CONDITIONS.(WIND NOT ALLOWED LOW      ISC44190
C        ENOUGH TO REQUIRE STABLE RISE IN CALM CONDITIONS.)                 ISC44200
C        BRIGGS(1975) EQ 59, PAGE 96.                                       ISC44210
      DELH=2.6*(F/(UPL*S))**0.333333                                        ISC44220
C        COMBINATION OF BRIGGS(1975) EQ 48 AND EQ 59. NOTE DISTF IN KM.     ISC44230
      DISTF=0.0020715*UPL/SQRT(S)                                           ISC44240
      GO TO 100                                                             ISC44250
C        UNSTABLE-NEUTRAL MOMENTUM RISE                                     ISC44260
C        BRIGGS(1969) EQN. 5.2, PAGE 59 NOTE: MOST ACCURATE WHEN VS/U>4;    ISC44270
C        TENDS TO OVERESTIMATE RISE WHEN VS/U<4 (SEE BRIGGS(1975) P. 78,    ISC44280
C         FIGURE 4.)                                                        ISC44290
   80 DELH=3.*VS*D/UPL                                                      ISC44300
      DISTF=0.                                                              ISC44310
      GO TO 100                                                             ISC44320
C        STABLE MOMENTUM RISE                                               ISC44330
   90 DHA=3.*VS*D/UPL                                                       ISC44340
C        BRIGGS(1969) EQUATION 4.28, PAGE 59                                ISC44350
      DELH=1.5*(VS*VS*D*D*TEMP/(4.*TS*UPL))**0.333333/S**0.166667           ISC44360
      IF (DHA.LT.DELH) DELH=DHA                                             ISC44370
      DISTF=0.                                                              ISC44380
C        STORE OFF PLUME HEIGHT(ETC.) FOR THIS SOURCE FOR USE WITH          ISC44390
C        OTHER RECEPTORS.                                                   ISC44400
  100   RETURN                                                              ISC44410
        END
```

```
C                                                                       ISC44420
      SUBROUTINE BLPLT (R0,YL,KST,F,FM,X,U,S,BETAJ,RISE)                ISC44430
C     SUBROUTINE BLPLT (VERSION 87338), PART OF ISCLT                   ISC44440
C                                                                       ISC44450
C      CALCULATES PLUME RISE AS IN THE BLP MODEL.                       ISC44460
C        SUBROUTINE IS CALLED ONCE TO SET COEF1 AND COEF2 AND ENTERED   ISC44470
C        SEVERAL TIMES LATER AT POINT BLPRIZ TO DETERMINE COEF0.        ISC44480
      REAL R0,YL,F,FM,X,U,S,BETAJ,RISE                                  ISC44490
      INTEGER KST                                                       ISC44500
      SAVE COEF1,COEF2                                                  ISC44510
      DATA PII /0.31831/, PI2I /0.63662/                                ISC44520
C       5.0 = 3/BETA   (BETA=0.6)                                       ISC44530
      COEF2 = 5.0 * (YL * PII + R0)                                     ISC44540
C       8.33333 = 3/BETA**2  (BETA=0.6)                                 ISC44550
      COEF1 = 8.33333 * R0 * (YL * PI2I + R0)                           ISC44560
      ENTRY BLPRIZ(KST,F,FM,X,U,S,BETAJ,RISE)                           ISC44570
      IF (KST .LE. 4) THEN                                              ISC44580
C       0.72 = 2*BETA**2                                                ISC44590
      COEF0 = (3.0*X/(U*U)) * (F*X/(0.72*U) + FM*BETAJ)                 ISC44600
      ELSE                                                              ISC44610
      COEF0 = 16.6667*F/(U*S) + 3.0*FM/(BETAJ*U*SQRT(S))                ISC44620
     1* SIN(SQRT(S)*X/U)                                                ISC44630
      ENDIF                                                             ISC44640
      COEF0 = -COEF0                                                    ISC44650
      CALL CUBIC (COEF2,COEF1,COEF0,RISE)                               ISC44660
      RETURN                                                            ISC44670
      END                                                               ISC44680
C                                                                       ISC44690
      SUBROUTINE CUBIC(A,B,C,Z)                                         ISC44700
C     SUBROUTINE CUBIC (VERSION 87338) PART OF ISCLT                    ISC44710
C                                                                       ISC44720
C     SOLVES FOR ONE ROOT OF THE CUBIC EQUATION:                        ISC44730
C     Z**3 + A*Z**2 + B*Z + C = 0                                       ISC44740
C                                                                       ISC44750
      IMPLICIT REAL*8 (A-H,O-Z)                                         ISC44760
      REAL A,B,C,Z                                                      ISC44770
      DATA ONE /1.0/                                                    ISC44780
      A3=A/3.                                                           ISC44790
      AP=B-A*A3                                                         ISC44800
      BP=2.*A3**3-A3*B+C                                                ISC44810
      AP3=AP/3.                                                         ISC44820
      BP2=BP/2.                                                         ISC44830
      TROOT=BP2*BP2+AP3*AP3*AP3                                         ISC44840
      IF(TROOT.LE.0.0)GO TO 50                                          ISC44850
      TR=SQRT(TROOT)                                                    ISC44860
      APP=(-BP2+TR)**0.333333                                           ISC44870
      BSV=-BP2-TR                                                       ISC44880
      IF(BSV.EQ.0.0)GO TO 45                                            ISC44890
      SGN=SIGN(ONE,BSV)                                                 ISC44900
      BPP=SGN*(ABS(BSV))**0.333333                                      ISC44910
      Z=APP+BPP-A3                                                      ISC44920
      RETURN                                                            ISC44930
 45   CONTINUE                                                          ISC44940
C     BSV (& BPP) = 0.0                                                 ISC44950
      Z=APP-A3                                                          ISC44960
      RETURN                                                            ISC44970
 50   CM=2.*SQRT(-AP3)                                                  ISC44980
```

```
ALPHA=ACOS(BP/(AP3*CM1))/3.                                    ISC44990
Z=CM*COS(ALPHA)-A3                                             ISC45000
RETURN                                                         ISC45010
END                                                            ISC45020
```

# APPENDIX C

# EXAMPLE EXECUTIONS OF THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

## C.1 INTRODUCTION

The following examples are problem runs using the ISC short-term (ISCST) program to model the hypothetical potash processing plant described in Section 2.6. The examples consist of two executions of the ISCST program over one "worst-case" day of meteorological data. The first run calculates average concentration and the second run calculates total deposition. The topics covered in this appendix are: the procedure for setting up the required input data; and examples of the program output.

In this section, it is assumed that the reader is familiar with Section 2.6, which discusses the hypothetical potash processing plant and provides the reader with figures and tables of specific input data information. Also, the reader should be familiar with Table 3-4 presented in Section 3.2.3.a, which provides the user with the format and description of all card input data parameters.

## C.2 EXAMPLE CONCENTRATION RUN

### C.2.1 Input Data Set-Up Procedure

Figure C-1 shows the 135 lines of card input data values required to compute the desired average concentrations for the hypothetical potash processing plant.

Note that some lines are blank and are to be included in the input data deck as blank lines. This is because a zero value, which is equivalent to a blank space, is the proper value of an input data parameter or because it is convenient to exercise the program's default capabilities for certain input parameters.

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | | 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
| 1 | 1 | -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- |
| 2 | 2 | 1 1 2 0 0 2 1 1 1 1 1 1 0 1 1 0 2 1 2 2 2 2 2 0 |
| | 3 | 16 19 19 64 5 |
| 3 | 4 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 5 | -200 0 200 400 600 800 1000 1250 |
| | 6 | 1500 2000 3000 |
| | 7 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 8 | -200 0 200 400 600 800 1000 1250 |
| | 9 | 1500 2000 3000 |
| | 10 | 555.0 317.0 |
| | 11 | 620.0 318.0 |
| | 12 | 685.0 320.0 |
| | 13 | 735.0 322.0 |
| | 14 | 800.0 326.0 |
| | 15 | 860.0 331.0 |
| | 16 | 900.0 336.0 |
| | 17 | 920.0 341.0 |
| | 18 | 940.0 346.0 |
| | 19 | 940.0 351.0 |
| | 20 | 935.0 356.0 |
| | 21 | 910.0 1.0 |
| | 22 | 950.0 6.0 |
| | 23 | 1015.0 11.0 |
| | 24 | 1055.0 16.0 |
| | 25 | 1075.0 21.0 |
| | 26 | 1075.0 26.0 |
| | 27 | 1045.0 31.0 |
| | 28 | 995.0 36.0 |
| | 29 | 910.0 41.0 |
| | 30 | 855.0 43.0 |
| | 31 | 755.0 45.0 |
| | 32 | 620.0 47.0 |
| | 33 | 525.0 49.0 |
| | 34 | 460.0 51.0 |
| | 35 | 355.0 56.0 |
| | 36 | 355.0 66.0 |
| | 37 | 355.0 76.0 |
| | 38 | 355.0 86.0 |
| | 39 | 350.0 96.0 |
| | 40 | 345.0 106.0 |
| | 41 | 335.0 116.0 |
| | 42 | 325.0 126.0 |
| | 43 | 380.0 136.0 |
| | 44 | 420.0 141.0 |
| | 45 | 450.0 146.0 |
| | 46 | 480.0 151.0 |
| | 47 | 505.0 156.0 |
| | 48 | 535.0 161.0 |
| | 49 | 575.0 166.0 |

Figure C-1. Card input data values for the hypothetical potash processing plant concentration run.

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | | 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
| | 50 | 620.0 171.0 |
| | 51 | 665.0 176.0 |
| | 52 | 705.0 181.0 |
| | 53 | 730.0 186.0 |
| | 54 | 745.0 191.0 |
| | 55 | 755.0 196.0 |
| | 56 | 755.0 201.0 |
| | 57 | 745.0 206.0 |
| | 58 | 730.0 211.0 |
| | 59 | 705.0 216.0 |
| | 60 | 690.0 221.0 |
| | 61 | 690.0 226.0 |
| | 62 | 690.0 231.0 |
| | 63 | 680.0 236.0 |
| | 64 | 665.0 241.0 |
| | 65 | 645.0 246.0 |
| | 66 | 615.0 251.0 |
| | 67 | 575.0 256.0 |
| | 68 | 530.0 261.0 |
| | 69 | 475.0 266.0 |
| | 70 | 410.0 271.0 |
| | 71 | 365.0 276.0 |
| | 72 | 365.0 286.0 |
| | 73 | 410.0 296.0 |
| 4 | 74 | 1 2 2 1 2 |
| | 75 | 1 2 -11 12 -15 16 1 16 |
| 5 | 76 | |
| | 77 | |
| | 78 | 1 |
| | 79 | |
| | 80 | |
| | 81 | |
| | 82 | |
| | 83 | 14913 64 14918 64 |
| 6 | 84 | 12 63 .1 -13.3 -13.3 0 10.0 26.6 |
| | 85 | .1 .4 .28 .12 .06 .04 |
| | 86 | .001 .007 .019 .037 .061 .099 |
| | 87 | 1.0 .82 .72 .65 .59 .5 |
| | 88 | 21 60 .13 20 0 0 .9 1 4.7 |
| | 89 | .1 .4 .28 .12 .06 .04 |
| | 90 | .001 .007 .019 .037 .061 .099 |
| | 91 | 1.0 .82 .72 .65 .59 .5 |
| | 92 | 31 60 .13 30 0 0 2.6 1 4.7 |
| | 93 | .1 .4 .28 .12 .06 .04 |
| | 94 | .001 .007 .019 .037 .061 .099 |
| | 95 | 1.0 .82 .72 .65 .59 .5 |
| | 96 | 41 60 .13 40 0 0 4.3 1 4.7 |
| | 97 | .1 .4 .28 .12 .06 .04 |
| | 98 | .001 .007 .019 .037 .061 .099 |

Figure C-1. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | | | | |
| | 99 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 100 | 51 | 60 | .13 | | 49 | | 0 | 0 | 6.1 | 1 | 4.7 | | | | | | | | | |
| | 101 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 102 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 103 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 104 | 61 | 60 | .13 | | 59 | | 0 | 0 | 7.8 | 1 | 4.7 | | | | | | | | | |
| | 105 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 106 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 107 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 108 | 71 | 60 | .13 | | 69 | | 0 | 0 | 9.6 | 1 | 4.7 | | | | | | | | | |
| | 109 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 110 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 111 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 112 | 81 | 60 | .13 | | 79 | | 0 | 0 | 11.3 | 1 | 4.7 | | | | | | | | | |
| | 113 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 114 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 115 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 116 | 91 | 60 | .13 | | 89 | | 0 | 0 | 13.0 | 1 | 4.7 | | | | | | | | | |
| | 117 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 118 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 119 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 120 | 101 | 60 | .13 | | 99 | | 0 | 0 | 14.8 | 1 | 4.7 | | | | | | | | | |
| | 121 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 122 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 123 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 124 | 111 | 60 | .13 | | 109 | | 0 | 0 | 16.5 | 1 | 4.7 | | | | | | | | | |
| | 125 | | .1 | | .4 | | .28 | | .12 | | .06 | | .04 | | | | | | | | |
| | 126 | | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | | | |
| | 127 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 128 | 121 | 00 | 2.63 | | 121 | | 0 | 0 | 22.5 | 11.6 | 10.8 | | | | | | | | | |
| | 129 | 131 | 00 | 2.63 | | 144 | | 0 | 0 | 22.5 | 11.6 | 10.8 | | | | | | | | | |
| | 130 | 141 | 00 | 2.63 | | 167 | | 0 | 0 | 22.5 | 11.6 | 10.8 | | | | | | | | | |
| | 131 | 151 | 00 | 2.63 | | 190 | | 0 | 0 | 22.5 | 11.6 | 10.8 | | | | | | | | | |
| | 132 | 1600 | 00 | 5.0 | | 201 | | 0 | 0 | 50.0 | 340 | | 8 | | 1 | | 25 | | 90 | | 50 |
| | 133 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | | | 1 | | | | 5 |
| | 134 | | 5 | | 5 | | 5 | | 5 | | 5 | | 5 | | | | 5 | | | | 1 |
| | 135 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | | | 1 | | | | 1 |

Figure C-1. (Continued)

The best procedure for setting up the input data for a problem run is to consider all of the ISCST program's input data parameters covered in Table 3-4. As each input data parameter in Table 3-4 is examined, Section 2.6 is consulted, when necessary, in order to obtain the applicable information for that parameter.

a. Card Group 1. The first input data parameter discussed in Table 3-4 is TITLE whose alphanumeric heading data occupies the first 60 characters of the first line as shown in Figure C-1.

b. Card Group 2. The second line consists of the ISW array where each entry is entered in 2-column integer fields. Because it is desired to calculate concentration values, a "1" is entered in column 2 according to ISW(1) in Table 3-4. Figure 2-3 is an illustration of the Cartesian receptor grid at which average concentration values are calculated. A "1" is entered in column 4 for ISW(2) to indicate that the receptor grid locations are referenced by the Cartesian coordinate system. Note that a "3" could not be entered in column 4 to indicate that a receptor grid will be generated by the program because the receptor grid used does not have equally spaced grid points. Although no mention of discrete receptor points is made in Section 2.6, this problem run includes 64 discrete receptor points which are oriented with respect to the receptor grid origin* by distance and direction. Hence, a "2" is entered in column 6 for ISW(3) to indicate to the program that the discrete receptor points are referenced as polar coordinates. ISW(4) indicates whether or not receptor terrain elevations are input. According to

*The origin for this example problem run has been (arbitrarily) defined at the center of the ore storage pile (Source 1).

Section 2.6, the terrain is relatively flat; hence, a "0" is entered in column 8 for ISW(4). Column 10 for ISW(5) is set to "0" since no input tape is desired. Column 12 for ISW(6) is set to "2" in order to obtain a listing of all input data. ISW(7) through ISW(14) indicate which time periods are considered by the program for the average concentration calculations. According to Section 2.6, only 24-hour average concentration values are desired. The descriptions of ISW(7) through ISW(14) in Table 3-4 state that only ISW(14) should be set to "1." Hence, columns 13 to 26 for ISW(7) to ISW(13) are blank (equivalent to "0") and column 28 for ISW(14) is set to "1." ISW(15) through ISW(18) indicate to the program which type of output tables are produced. For the purpose of illustration, all types of output tables are produced. A "1" is entered in columns 30, 32 34, and 36 for ISW(15) through ISW(18) for "N"-day, daily, highest and second highest, and maximum 50 tables, respectively. The hourly meteorological data reside on a file in a format generated by the preprocessor program; hence a "1" is entered in column 38 for ISW(19) to indicate to the program the format of the hourly meteorological data. According to Section 2.6, a rural mode is desired; hence, a "0" is entered in column 40 for ISW(20). The descriptions of ISW(21) and ISW(22) indicate whether or not the user should provide wind-profile exponents and vertical potential temperature gradients. Because no site-specific wind-profile exponents and vertical potential temperature gradients are given in Section 2.6, column 41 for ISW(21) and column 42 for ISW(22) are set to "1" in order to use the program default values. ISW(23) indicates whether or not scalars are input to vary the average emission rates for <u>all</u> sources. According to Section 2.6, only one source (the ore pile) has a variational emission rate. A "0" is then entered in column 46 of ISW(23) to indicate that this option is not desired for all sources. Because wake effects are to be considered, the distance-dependent plume rise should be

used. This is indicated by setting ISW(24) to "2". The physical stack heights of all sources (in this example, only Source 16 is considered) are not modified due to stack-tip downwash, which is indicated by setting ISW(25) to "1". ISW(26), ISW(27), ISW(28), ISW(29) and ISW(30) were all set to "2" indicating that buoyancy induced dispersion was not considered, processing of calm winds was not performed, the regulatory mode was not chosen, a pollutant other than $SO_2$ was modeled and an input debug mode was not chosen, respectively. ISW(31) was left blank (equivalent to "0") indicating that no receptors were located above ground level.

The second line of Card Group 2 (the third card image) completes this Card Group as shown in Figure C-1. A "16" is entered for the number of sources (NSOURC) in columns 1-6. This value is obtained from Table 2-15 which lists all sources required to model the hypothetical potash processing plant. The next three parameters discussed in this Card Group pertain to the size of the receptor grid and number of discrete receptor points. By counting the number of X- and Y-axis grid points in Figure 2-3, a "19" value is entered in both columns 7-12 and 13-18 for parameters NXPNTS and NYPNTS. For the purpose of illustration, 64 discrete receptor points are used in this example run. NGROUP specifies the number of source group combinations desired. According to Section 2.6, it is of interest to see the contributions from the ore pile (Source 1), the conveyor belt (Sources 2-11), the roof monitor (Sources 12-15), the stack (Source 16), and the plant as a whole (Sources 1-16). Hence, a "5" is entered in column 30 for the number of source groups. Columns 31-36 for IPERD are left blank because all 24-hour time periods per day are to be printed. IPERD is intended for use only for time periods less than 24 hours. The following two parameters, NHOURS and NDAYS, are not applicable for this example run because these parameters apply only when hourly meteorological data are in a card image format (ISW(19) = "2"); the program then ignores any data contained in columns 37 through 48.

c. Card Group 3. This Card Group contains the locations of the receptor grid points and discrete receptor points. For this example problem run, this Card Group consists of lines (card images) 4 through 73 as shown in Figure C-1. According to Table 3-4, the X-axis grid locations are entered first in GRIDX with 8 values per line in ten-column fields continuing onto other lines (card images) as needed. Similarly, the Y-axis locations are then entered in GRIDY beginning a new line (card image) in the same fashion as the X-axis locations. Because the receptor terrain is relatively flat, no receptor terrain elevations are entered for GRIDZ. Since no receptors are located above ground level, no receptor heights above ground are entered for RHT. It is assumed that the receptor grid values represented in Figure 2-3 are in meters which are the units required by the program. Beginning with the seventh line (card image) of this Card Group, 64(NXWYPT) discrete receptor cards are entered. Each card consists of XDIS, YDIS, GRIDZ, and RHT for 1 receptor. Since receptor elevations and receptor heights are not considered, the third and last entries in each card, (GRIDZ) and (RHT) respectively, are left blank.

d. Card Group 4. Because source group combinations are desired in this example problem run (NGROUP>"0"), it is necessary to specify which sources constitute each source group. The first line of this Card Group consists of the values entered for parameter NSOGRP. According to Section 2.6, the source numbers which define each source group are 1, 2-11, 12-15, 16, and 1-16. Values of "1", "2", "2", "1", and "2" are entered in columns 4, 8, 12, 16, and 20, respectively, for NSOGRP because each value is the number of source numbers which must be read from the IDSOR array in order to define a source group. The next line (parameter IDSOR) consists of the source numbers which define each source group. Note that the minus sign preceding a source number

implies inclusive summing from the previous source number entered to the source number with the minus sign.

e. Card Group 5. Because no special wind-profile exponents and vertical potential temperature gradients are considered, parameters ISW(21) and ISW(22) described in Card Group 2 are set to "1," directing the program not to read the first two parameters, PDEF and DTHDEF, of this Card Group. Hence, the first line of this Card Group consists of parameters ZR and UCATS. This line is completely blank because it is assumed that the wind speed reference height is the default value (10 meters) and because no special consideration is mentioned in Section 2.6 regarding wind speed categories. Similarly, the next line is blank because all parameters contained on the line may default to program-provided values. That is, the default values for TK, IQUN, and ICHIUN may be used since the emission rate units of all sources given in Table 2-15 are the same as the program's default units and it is assumed that the desired units of the average concentration values are the same as the program's default units. Also, no mention is made in Section 2.6 regarding chemical depletion (DECAY). Furthermore, it is assumed that the hourly meteorological data file is associated with FORTRAN logical unit number 9 (the program's default value for IMET). The next five lines of this Card Group (the third through seventh line of this Card Group), consist of the IDAY array and are read by the program since ISW(19) equals "1." In this array, the Julian Day of the "worst-case" day of meteorological data (not discussed in Section 2.6) is specified. For this case, Julian Day 51 was chosen. The last line of this Card Group contains input data parameters which also pertain to the hourly meteorological data file and must be entered since ISW(19) equals "1." The surface and upper air station numbers and the years of the data are entered according to the formats of parameters ISS, ISY, IUS, and IUY described in Table 3-4.

f. Card Group 6. This Card Group consists of all source data whose values are provided by Tables 2-14, 2-15, and 2-16 in Section 2.6. For each of the 16 sources, one main card of values contains most, if not all, of the data required for a source. This card consists of parameters NSO through HW described in Table 3-4. According to Section 2.6, the ore pile (Source 1) and the conveyor belt (Sources 2-11) have significant particulate emissions which requires 6 gravitational particulate categories of data as shown in Table 2-14. Hence, a "6" is entered in column 9 for NVS for Sources 1-11 which directs the program to read the gravitational particulate data for PHI, VSN, and GAMMA immediately following the main source card for which the particulate data are applicable. Because particulate emissions from sources 12-16 do not have significant settling velocities, column 9 for NVS is "0" and no particulate data are read by the program for these sources. Since the building height has not been entered as a negative value for source 16 and the regulatory default mode are not chosen (ISW(28)=2), no direction specific building dimensions are read. Because the emission rate for the ore pile (Source 1) varies depending on the hour of the day (see Table 2-16), a "3" is entered in column 10 for QFLG for Source 1. The "3" value, which is the value required by the program in order to vary emission rates for each hour of the day, directs the program to read one set of 24 source emission rate scalars in QTK. Note that QTK is read after all other source input data are entered and consists of the last three lines (card images) of this Card Group. According to Table 2-16, the emission rate for Source 1 equals 0.1 grams per second per square meter for hours 01-07 and 16-24, and equals 0.5 for hours 08-15. A value of 0.1 is entered in columns 11-18 for the emission rate Q for Source 1. Then, scalar values of 1.0 are entered for the first seven values (hours 01-07) and for the last nine values (hours 16-24) in QTK since no scaling is needed for the emission rate of Source 1 for those hours. The eighth through fifteenth scalar values (hours 08-15) equal 5.0 since it is desired to scale

the source emission rate from 0.1 to 0.5 for those hours. The values in QTK are entered in 8 ten-column fields and continue onto other lines (card images) as needed. In this case, QTK consists of three lines.

The card deck described above completes the required card input data for computing the desired average concentration values for the hypothetical potash processing plant. Because the hourly meteorological data are read from an external file (because ISW(19) = "1"), Card Group 7 is not read by the program. The external hourly meteorological file must be assigned and associated to FORTRAN logical unit 9 before execution of the program.

### C.2.2 Output Format

Figures C-2 through C-8 illustrate the content and format of the print output produced by this example run. Figures C-2 and C-3 are generated since ISW(6) equals "2" in this problem run. Figure C-3 is a listing of the one day of hourly meteorological data. Because the program found distances between sources and receptors less than 1 meter, a diagnostic table is printed, as shown in Figure C-4, which lists all source-receptor combinations found and the distance computed between each combination. Note that a negative distance implies that the receptor lies within the boundaries of the source. Figure C-5 shows one table produced by this example run for the ISW(16) option. Note that the heading of the table identifies the day, averaging period and source group that represents the average concentration values printed for all receptors. Also, note that the average concentration values printed for the receptor grid provide ease of interpretation of the impact of the pollutant over the receptor grid domain. That is, the table format allows one to obtain a "visual" picture of the pollutant's pattern or trend. This features occurs only with Cartesian receptor grids because the receptor grid locations are entered in ascending order as shown in Figure C-1. An illustration of an "N"-day table generated by the ISW(15) option is shown in

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

| | |
|---|---|
| CALCULATE (CONCENTRATION=1,DEPOSITION=2) | ISW(1) = 1 |
| RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4) | ISW(2) = 1 |
| DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2) | ISW(3) = 2 |
| TERRAIN ELEVATIONS ARE READ (YES=1,NO=0) | ISW(4) = 0 |
| CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0) | ISW(5) = 0 |
| LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2) | ISW(6) = 2 |
| | |
| COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION) | |
| WITH THE FOLLOWING TIME PERIODS: | |
| HOURLY (YES=1,NO=0) | ISW(7) = 0 |
| 2-HOUR (YES=1,NO=0) | ISW(8) = 0 |
| 3-HOUR (YES=1,NO=0) | ISW(9) = 0 |
| 4-HOUR (YES=1,NO=0) | ISW(10) = 0 |
| 6-HOUR (YES=1,NO=0) | ISW(11) = 0 |
| 8-HOUR (YES=1,NO=0) | ISW(12) = 0 |
| 12-HOUR (YES=1,NO=0) | ISW(13) = 0 |
| 24-HOUR (YES=1,NO=0) | ISW(14) = 1 |
| PRINT 'N'-DAY TABLE(S) (YES=1,NO=0) | ISW(15) = 1 |
| | |
| PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE | |
| SPECIFIED BY ISW(7) THROUGH ISW(14): | |
| DAILY TABLES (YES=1,NO=0) | ISW(16) = 1 |
| HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0) | ISW(17) = 1 |
| MAXIMUM 50 TABLES (YES=1,NO=0) | ISW(18) = 1 |
| METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2) | ISW(19) = 1 |
| RURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. MODE 2=2,UR. MODE 3=3) | ISW(20) = 0 |
| WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3) | ISW(21) = 1 |
| VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3) | ISW(22) = 1 |
| SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0) | ISW(23) = 0 |
| PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2) | ISW(24) = 2 |
| PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1) | ISW(25) = 1 |
| PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2) | ISW(26) = 2 |
| CONCENTRATIONS DURING CALM PERIODS SET = 0 (YES=1,NO=2) | ISW(27) = 2 |
| REG. DEFAULT OPTION CHOSEN (YES=1,NO=2) | ISW(28) = 2 |
| TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER) | ISW(29) = 2 |
| DEBUG OPTION CHOSEN (YES=1,NO=2) | ISW(30) = 2 |
| ABOVE GROUND (FLAGPOLE) RECEPTORS USED (YES=1,NO=0) | ISW(31) = 0 |
| | |
| NUMBER OF INPUT SOURCES | NSOURC = 16 |
| NUMBER OF SOURCE GROUPS (=0,ALL SOURCES) | NGROUP = 5 |
| TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS) | IPERD = 0 |
| NUMBER OF X (RANGE) GRID VALUES | NXPNTS = 19 |
| NUMBER OF Y (THETA) GRID VALUES | NYPNTS = 19 |
| NUMBER OF DISCRETE RECEPTORS | NXWYPT = 64 |
| SOURCE EMISSION RATE UNITS CONVERSION FACTOR | TK = .10000+007 |
| HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED | ZR = 10.00 METERS |
| LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA | IMET = 9 |
| DECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETION | DECAY = .000000 |
| SURFACE STATION NO. | ISS = 14913 |
| YEAR OF SURFACE DATA | ISY = 64 |
| UPPER AIR STATION NO. | IUS = 14918 |
| YEAR OF UPPER AIR DATA | IUY = 64 |
| ALLOCATED DATA STORAGE | LIMIT = 43500 WORDS |
| REQUIRED DATA STORAGE FOR THIS PROBLEM RUN | MINIT = 12363 WORDS |

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** METEOROLOGICAL DAYS TO BE PROCESSED ***
(IF=1)

```
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0
```

*** NUMBER OF SOURCE NUMBERS REQUIRED TO DEFINE SOURCE GROUPS ***
(NSOGRP)

1, 2, 2, 1, 2,

*** SOURCE NUMBERS DEFINING SOURCE GROUPS ***
(IDSOR)

1, 2, -11, 12, -15, 16, 1, 16,

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

| STABILITY CATEGORY | WIND SPEED CATEGORY 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| A | .70000-001 | .70000-001 | .70000-001 | .70000-001 | .70000-001 | .70000-001 |
| B | .70000-001 | .70000-001 | .70000-001 | .70000-001 | .70000-001 | .70000-001 |
| C | .10000+000 | .10000+000 | .10000+000 | .10000+000 | .10000+000 | .10000+000 |
| D | .15000+000 | .15000+000 | .15000+000 | .15000+000 | .15000+000 | .15000+000 |
| E | .35000+000 | .35000+000 | .35000+000 | .35000+000 | .35000+000 | .35000+000 |
| F | .55000+000 | .55000+000 | .55000+000 | .55000+000 | .55000+000 | .55000+000 |

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

| STABILITY CATEGORY | WIND SPEED CATEGORY 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| A | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| B | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| C | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| D | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| E | .20000-001 | .20000-001 | .20000-001 | .20000-001 | .20000-001 | .20000-001 |
| F | .35000-001 | .35000-001 | .35000-001 | .35000-001 | .35000-001 | .35000-001 |

*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-3000.0, -2000.0, -1500.0, -1250.0, -1000.0, -800.0, -600.0, -400.0, -200.0, .0,
200.0, 400.0, 600.0, 800.0, 1000.0, 1250.0, 1500.0, 2000.0, 3000.0,

*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-3000.0, -2000.0, -1500.0, -1250.0, -1000.0, -800.0, -600.0, -400.0, -200.0, .0,
200.0, 400.0, 600.0, 800.0, 1000.0, 1250.0, 1500.0, 2000.0, 3000.0,

*** RANGE,THETA COORDINATES OF DISCRETE RECEPTORS ***
(METERS,DEGREES)

( 555.0, 317.0), ( 620.0, 318.0), ( 685.0, 320.0), ( 735.0, 322.0), ( 800.0, 326.0),
( 860.0, 331.0), ( 900.0, 336.0), ( 920.0, 341.0), ( 940.0, 346.0), ( 940.0, 351.0),
( 935.0, 356.0), ( 910.0, 1.0), ( 950.0, 6.0), ( 1015.0, 11.0), ( 1055.0, 16.0),
( 1075.0, 21.0), ( 1075.0, 26.0), ( 1045.0, 31.0), ( 995.0, 36.0), ( 910.0, 41.0),
( 855.0, 43.0), ( 755.0, 45.0), ( 620.0, 47.0), ( 525.0, 49.0), ( 460.0, 51.0),
( 355.0, 56.0), ( 355.0, 66.0), ( 355.0, 76.0), ( 355.0, 86.0), ( 350.0, 96.0),
( 345.0, 106.0), ( 335.0, 116.0), ( 325.0, 126.0), ( 380.0, 136.0), ( 420.0, 141.0),
( 450.0, 146.0), ( 480.0, 151.0), ( 505.0, 156.0), ( 535.0, 161.0), ( 575.0, 166.0),
( 620.0, 171.0), ( 665.0, 176.0), ( 705.0, 181.0), ( 730.0, 186.0), ( 745.0, 191.0),
( 755.0, 196.0), ( 755.0, 201.0), ( 745.0, 206.0), ( 730.0, 211.0), ( 705.0, 216.0),
( 690.0, 221.0), ( 690.0, 226.0), ( 690.0, 231.0), ( 680.0, 236.0), ( 665.0, 241.0),
( 645.0, 246.0), ( 615.0, 251.0), ( 575.0, 256.0), ( 530.0, 261.0), ( 475.0, 266.0),
( 410.0, 271.0), ( 365.0, 276.0), ( 365.0, 286.0), ( 410.0, 296.0), (

FIGURE C-2. (Continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

*** SOURCE DATA ***

| SOURCE NUMBER | TYPE | WAK | NUMBER PART. CATS. | EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2 | X (METERS) | Y (METERS) | BASE ELEV. (METERS) | HEIGHT (METERS) | TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS) | EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS) | DIAMETER TYPE=0 (METERS) | BLDG. HEIGHT TYPE=0 (METERS) | BLDG. LENGTH TYPE=0 (METERS) | BLDG. WIDTH TYPE=0 (METERS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 0 | 6 | .10000+000 | -13.3 | -13.3 | .0 | 10.00 | .00 | 26.60 | .00 | .00 | .00 | .00 |
| 2 | 1 | 0 | 6 | .13000+000 | 20.0 | .0 | .0 | .90 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 3 | 1 | 0 | 6 | .13000+000 | 30.0 | .0 | .0 | 2.60 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 4 | 1 | 0 | 6 | .13000+000 | 40.0 | .0 | .0 | 4.30 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 5 | 1 | 0 | 6 | .13000+000 | 49.0 | .0 | .0 | 6.10 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 6 | 1 | 0 | 6 | .13000+000 | 59.0 | .0 | .0 | 7.80 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 7 | 1 | 0 | 6 | .13000+000 | 69.0 | .0 | .0 | 9.60 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 8 | 1 | 0 | 6 | .13000+000 | 79.0 | .0 | .0 | 11.30 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 9 | 1 | 0 | 6 | .13000+000 | 89.0 | .0 | .0 | 13.00 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 10 | 1 | 0 | 6 | .13000+000 | 99.0 | .0 | .0 | 14.80 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 11 | 1 | 0 | 6 | .13000+000 | 109.0 | .0 | .0 | 16.50 | 1.00 | 4.70 | .00 | .00 | .00 | .00 |
| 12 | 1 | 0 | 0 | .26300+001 | 121.0 | .0 | .0 | 22.50 | 11.60 | 10.80 | .00 | .00 | .00 | .00 |
| 13 | 1 | 0 | 0 | .26300+001 | 144.0 | .0 | .0 | 22.50 | 11.60 | 10.80 | .00 | .00 | .00 | .00 |
| 14 | 1 | 0 | 0 | .26300+001 | 167.0 | .0 | .0 | 22.50 | 11.60 | 10.80 | .00 | .00 | .00 | .00 |
| 15 | 1 | 0 | 0 | .26300+001 | 190.0 | .0 | .0 | 22.50 | 11.60 | 10.80 | .00 | .00 | .00 | .00 |
| 16 | 0 | 0 | 0 | .50000+001 | 201.0 | .0 | .0 | 50.00 | 340.00 | 8.00 | 1.00 | 25.00 | 90.00 | 50.00 |

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =      1 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =      2 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =      3 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =     4 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     5 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     6 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =     7 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     8 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =     9 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

```
*** --  HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION  -- ***

                    *** SOURCE PARTICULATE DATA ***


*** SOURCE NUMBER =    10 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,

*** SOURCE NUMBER =    11 ***

MASS FRACTION =
 .10000, .40000, .28000, .12000, .06000, .04000,

SETTLING VELOCITY(METERS/SEC) =
  .0010,  .0070,  .0190,  .0370,  .0610,  .0990,

SURFACE REFLECTION COEFFICIENT =
1.00000, .82000, .72000, .65000, .59000, .50000,
```

FIGURE C-2. (continued)

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HOUR OF THE DAY *

| HOUR | SCALAR | HOUR | SCALAR | HOUR | SCALAR | HOUR | SCALAR | HOUR | SCALAR | HOUR | SCALAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SOURCE NO. = 1 | | | | | | | | | | | |
| 1 | .10000+001 | 2 | .10000+001 | 3 | .10000+001 | 4 | .10000+001 | 5 | .10000+001 | 6 | .10000+001 |
| 7 | .10000+001 | 8 | .50000+001 | 9 | .50000+001 | 10 | .50000+001 | 11 | .50000+001 | 12 | .50000+001 |
| 13 | .50000+001 | 14 | .50000+001 | 15 | .50000+001 | 16 | .10000+001 | 17 | .10000+001 | 18 | .10000+001 |
| 19 | .10000+001 | 20 | .10000+001 | 21 | .10000+001 | 22 | .10000+001 | 23 | .10000+001 | 24 | .10000+001 |

FIGURE C-3. Listing of one day of hourly meteorological data used for the hypothetical potash processing plant concentration run.

MET. DATA
DAY 51

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* METEOROLOGICAL DATA FOR DAY 51 *

| HOUR | FLOW VECTOR (DEGREES) | RANDOM FLOW VECTOR (DEGREES) | WIND SPEED (MPS) | MIXING HEIGHT (METERS) | TEMP. (DEG. K) | INPUT STABILITY CATEGORY | ADJUSTED STABILITY CATEGORY |
|---|---|---|---|---|---|---|---|
| 1 | 160.0 | 158.0 | 5.14 | 761.2 | 261.5 | 4 | 4 |
| 2 | 160.0 | 163.0 | 3.60 | 764.2 | 260.4 | 5 | 5 |
| 3 | 150.0 | 154.0 | 3.60 | 767.2 | 259.8 | 5 | 5 |
| 4 | 150.0 | 151.0 | 4.63 | 770.2 | 258.7 | 5 | 5 |
| 5 | 150.0 | 148.0 | 5.66 | 773.1 | 258.1 | 4 | 4 |
| 6 | 140.0 | 143.0 | 6.17 | 776.1 | 257.6 | 4 | 4 |
| 7 | 150.0 | 152.0 | 6.17 | 779.1 | 257.0 | 4 | 4 |
| 8 | 150.0 | 155.0 | 5.66 | 782.1 | 257.0 | 4 | 4 |
| 9 | 160.0 | 162.0 | 4.63 | 785.1 | 256.5 | 3 | 3 |
| 10 | 160.0 | 157.0 | 5.14 | 788.1 | 253.7 | 4 | 4 |
| 11 | 170.0 | 173.0 | 5.14 | 791.0 | 260.9 | 4 | 4 |
| 12 | 160.0 | 162.0 | 6.17 | 794.0 | 262.6 | 4 | 4 |
| 13 | 150.0 | 148.0 | 4.63 | 797.0 | 263.7 | 3 | 3 |
| 14 | 160.0 | 160.0 | 6.69 | 800.0 | 264.8 | 4 | 4 |
| 15 | 150.0 | 154.0 | 6.17 | 800.0 | 264.8 | 4 | 4 |
| 16 | 150.0 | 146.0 | 6.69 | 800.0 | 265.4 | 4 | 4 |
| 17 | 160.0 | 158.0 | 6.17 | 800.0 | 264.8 | 4 | 4 |
| 18 | 160.0 | 157.0 | 4.12 | 802.9 | 263.1 | 5 | 5 |
| 19 | 160.0 | 165.0 | 3.60 | 809.5 | 262.0 | 5 | 5 |
| 20 | 160.0 | 161.0 | 4.63 | 816.1 | 260.9 | 5 | 5 |
| 21 | 160.0 | 165.0 | 5.14 | 822.7 | 259.8 | 5 | 5 |
| 22 | 160.0 | 156.0 | 3.60 | 829.3 | 259.3 | 5 | 5 |
| 23 | 150.0 | 146.0 | 4.12 | 835.9 | 258.7 | 5 | 5 |
| 24 | 160.0 | 160.0 | 5.66 | 842.5 | 258.1 | 4 | 4 |

FIGURE C-4. Listing of the diagnostic message table produced by the hypothetical potash processing plant concentration run.

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* SOURCE-RECEPTOR COMBINATIONS LESS THAN 001 METERS OR THREE BUILDING HEIGHTS IN DISTANCE. NO AVERAGE CONCENTRATION IS CALCULATED *

| SOURCE NUMBER | - - RECEPTOR LOCATION - - X OR RANGE (METERS) | Y (METERS) OR DIRECTION (DEGREES) | DISTANCE BETWEEN (METERS) |
|---|---|---|---|
| 1 | .0 | .0 | -15.01 |
| 15 | 200.0 | .0 | -13.22 |
| 16 | 200.0 | .0 | 1.00 |

FIGURE C-5. Listing of the table of 24-hour average concentration values computed on day 51 from Sources 12 to 15 by the hypothetical potash processing plant concentration run.

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT ( 200.0, -200.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) -3000.0 | -2000.0 | -1500.0 | -1250.0 | -1000.0 | -800.0 | -600.0 | -400.0 | -200.0 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| .0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00001 |
| -2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00017 |
| -3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00001 | .00144 |

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT ( 200.0, -200.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) .0 | 200.0 | 400.0 | 600.0 | 800.0 | 1000.0 | 1250.0 | 1500.0 | 2000.0 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| .0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -200.0 / | .00000 | 211.57320 | 5.08344 | .00009 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -400.0 / | .00017 | 40.91343 | 129.94168 | 2.01586 | .00189 | .00000 | .00000 | .00000 | .00000 |
| -600.0 / | .00225 | 13.26752 | 146.76246 | 40.94308 | 1.11987 | .00598 | .00001 | .00000 | .00000 |
| -800.0 / | .00779 | 7.13839 | 90.19569 | 73.74287 | 16.77151 | .71139 | .00348 | .00002 | .00000 |
| -1000.0 / | .01547 | 4.54630 | 46.60481 | 83.06282 | 36.20046 | 7.91083 | .21393 | .00218 | .00000 |
| -1250.0 / | .02530 | 2.88374 | 18.57100 | 61.05610 | 50.14821 | 23.30838 | 3.69604 | .16608 | .00007 |
| -1500.0 / | .03343 | 1.96899 | 8.47299 | 41.08075 | 50.99602 | 30.24997 | 13.27117 | 2.00615 | .00469 |
| -2000.0 / | .04291 | 1.06206 | 3.54489 | 13.79556 | 30.84629 | 34.87407 | 21.82375 | 12.41379 | .79199 |
| -3000.0 / | .04476 | .44064 | 1.45587 | 2.24696 | 6.53760 | 15.22239 | 18.41441 | 19.59296 | 8.39733 |

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 211.57320 AND OCCURRED AT ( 200.0, -200.0) *

| Y-AXIS (METERS) / | X-AXIS (METERS) 3000.0 |
|---|---|
| 3000.0 / | .00000 |
| 2000.0 / | .00000 |
| 1500.0 / | .00000 |
| 1250.0 / | .00000 |
| 1000.0 / | .00000 |
| 800.0 / | .00000 |
| 600.0 / | .00000 |
| 400.0 / | .00000 |
| 200.0 / | .00000 |
| .0 / | .00000 |
| -200.0 / | .00000 |
| -400.0 / | .00000 |
| -600.0 / | .00000 |
| -800.0 / | .00000 |
| -1000.0 / | .00000 |
| -1250.0 / | .00000 |
| -1500.0 / | .00000 |
| -2000.0 / | .00003 |
| -3000.0 / | .23269 |

FIGURE C-5. (continued)

DAILY: 51
24-HR/PD 1
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 51 *
* FROM SOURCES: 12, -15,
* FOR THE DISCRETE RECEPTOR POINTS *

| - RNG - | - DIR - | CON. | - RNG - | - DIR - | CON. | - RNG - | - DIR - | CON. |
|---|---|---|---|---|---|---|---|---|
| 555.0 | 317.0 | .00000 | 620.0 | 318.0 | .00000 | 685.0 | 320.0 | .00000 |
| 735.0 | 322.0 | .00000 | 800.0 | 326.0 | .00000 | 860.0 | 331.0 | .00000 |
| 900.0 | 336.0 | .00000 | 920.0 | 341.0 | .00000 | 940.0 | 346.0 | .00000 |
| 940.0 | 351.0 | .00000 | 935.0 | 356.0 | .00000 | 910.0 | 1.0 | .00000 |
| 950.0 | 6.0 | .00000 | 1015.0 | 11.0 | .00000 | 1055.0 | 16.0 | .00000 |
| 1075.0 | 21.0 | .00000 | 1075.0 | 26.0 | .00000 | 1045.0 | 31.0 | .00000 |
| 995.0 | 36.0 | .00000 | 910.0 | 41.0 | .00000 | 855.0 | 43.0 | .00000 |
| 755.0 | 45.0 | .00000 | 620.0 | 47.0 | .00000 | 525.0 | 49.0 | .00000 |
| 460.0 | 51.0 | .00000 | 355.0 | 56.0 | .00000 | 355.0 | 66.0 | .00000 |
| 355.0 | 76.0 | .00000 | 355.0 | 86.0 | .00000 | 350.0 | 96.0 | .00007 |
| 345.0 | 106.0 | .80927 | 335.0 | 116.0 | 64.76668 | 325.0 | 126.0 | 279.48573 |
| 380.0 | 136.0 | 268.55373 | 420.0 | 141.0 | 220.75506 | 450.0 | 146.0 | 149.28621 |
| 480.0 | 151.0 | 78.51823 | 505.0 | 156.0 | 30.88540 | 535.0 | 161.0 | 11.31163 |
| 575.0 | 166.0 | 3.81649 | 620.0 | 171.0 | .77240 | 665.0 | 176.0 | .06775 |
| 705.0 | 181.0 | .00201 | 730.0 | 186.0 | .00002 | 745.0 | 191.0 | .00000 |
| 755.0 | 196.0 | .00000 | 755.0 | 201.0 | .00000 | 745.0 | 206.0 | .00000 |
| 730.0 | 211.0 | .00000 | 705.0 | 216.0 | .00000 | 690.0 | 221.0 | .00000 |
| 690.0 | 226.0 | .00000 | 690.0 | 231.0 | .00000 | 680.0 | 236.0 | .00000 |
| 665.0 | 241.0 | .00000 | 645.0 | 246.0 | .00000 | 615.0 | 251.0 | .00000 |
| 575.0 | 256.0 | .00000 | 530.0 | 261.0 | .00000 | 475.0 | 266.0 | .00000 |
| 410.0 | 271.0 | .00000 | 365.0 | 276.0 | .00000 | 365.0 | 286.0 | .00000 |
| 410.0 | 296.0 | .00000 | | | | | | |

FIGURE C-6. Listing of the table of the 1-day average concentration values computed from Sources 2 to 11 by the hypothetical potash processing plant.

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) -3000.0 | -2000.0 | -1500.0 | -1250.0 | -1000.0 | -800.0 | -600.0 | -400.0 | -200.0 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| .0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00002 |
| -2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00006 |
| -3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00001 | .00084 |

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) .0 | 200.0 | 400.0 | 600.0 | 800.0 | 1000.0 | 1250.0 | 1500.0 | 2000.0 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 2000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1500.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1250.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 1000.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 800.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 600.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 400.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| 200.0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| .0 / | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -200.0 / | .16369 | 49.39831 | .00175 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -400.0 / | .12443 | 59.65531 | 6.81886 | .00738 | .00000 | .00000 | .00000 | .00000 | .00000 |
| -600.0 / | .09501 | 19.22733 | 22.29162 | 1.71592 | .01037 | .00003 | .00000 | .00000 | .00000 |
| -800.0 / | .07510 | 5.41674 | 22.40206 | 7.92875 | .65617 | .01115 | .00004 | .00000 | .00000 |
| -1000.0 / | .06125 | 2.01118 | 14.87403 | 10.93714 | 3.70798 | .32736 | .00411 | .00003 | .00000 |
| -1250.0 / | .05019 | .98807 | 8.23682 | 11.21170 | 5.63243 | 2.32460 | .16850 | .00438 | .00000 |
| -1500.0 / | .04175 | .62678 | 3.74932 | 8.00290 | 7.26216 | 3.53813 | 1.10361 | .09992 | .00012 |
| -2000.0 / | .03003 | .31275 | .81057 | 3.90889 | 5.05595 | 5.03393 | 2.50033 | 1.41317 | .04512 |
| -3000.0 / | .01744 | .11117 | .24047 | .45082 | 1.60626 | 2.51844 | 2.71308 | 2.54611 | 1.05850 |

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

### -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION --

1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER)

FROM SOURCES: 2, -11,
FOR THE RECEPTOR GRID

MAXIMUM VALUE EQUALS 59.65531 AND OCCURRED AT ( 200.0, -400.0)

| Y-AXIS (METERS) / | 3000.0 |
|---|---|
| 3000.0 / | .00000 |
| 2000.0 / | .00000 |
| 1500.0 / | .00000 |
| 1250.0 / | .00000 |
| 1000.0 / | .00000 |
| 800.0 / | .00000 |
| 600.0 / | .00000 |
| 400.0 / | .00000 |
| 200.0 / | .00000 |
| .0 / | .00000 |
| -200.0 / | .00000 |
| -400.0 / | .00000 |
| -600.0 / | .00000 |
| -800.0 / | .00000 |
| -1000.0 / | .00000 |
| -1250.0 / | .00000 |
| -1500.0 / | .00000 |
| -2000.0 / | .00000 |
| -3000.0 / | .01552 |

X-AXIS (METERS)

FIGURE C-6. (continued)

'N'-DAY
1 DAYS
SGROUP# 2

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 1-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 2, -11,
* FOR THE DISCRETE RECEPTOR POINTS *

| - RNG - | - DIR - | CON. | - RNG - | - DIR - | CON. | - RNG - | - DIR - | CON. |
|---|---|---|---|---|---|---|---|---|
| 555.0 | 317.0 | .00000 | 620.0 | 318.0 | .00000 | 685.0 | 320.0 | .00000 |
| 735.0 | 322.0 | .00000 | 800.0 | 326.0 | .00000 | 860.0 | 331.0 | .00000 |
| 900.0 | 336.0 | .00000 | 920.0 | 341.0 | .00000 | 940.0 | 346.0 | .00000 |
| 940.0 | 351.0 | .00000 | 935.0 | 356.0 | .00000 | 910.0 | 1.0 | .00000 |
| 950.0 | 6.0 | .00000 | 1015.0 | 11.0 | .00000 | 1055.0 | 16.0 | .00000 |
| 1075.0 | 21.0 | .00000 | 1075.0 | 26.0 | .00000 | 1045.0 | 31.0 | .00000 |
| 995.0 | 36.0 | .00000 | 910.0 | 41.0 | .00000 | 855.0 | 43.0 | .00000 |
| 755.0 | 45.0 | .00000 | 620.0 | 47.0 | .00000 | 525.0 | 49.0 | .00000 |
| 460.0 | 51.0 | .00000 | 355.0 | 56.0 | .00000 | 355.0 | 66.0 | .00000 |
| 355.0 | 76.0 | .00000 | 355.0 | 86.0 | .00000 | 350.0 | 96.0 | .00000 |
| 345.0 | 106.0 | .00000 | 335.0 | 116.0 | .02385 | 325.0 | 126.0 | 4.26651 |
| 380.0 | 136.0 | 27.07583 | 420.0 | 141.0 | 42.16629 | 450.0 | 146.0 | 55.55005 |
| 480.0 | 151.0 | 58.16101 | 505.0 | 156.0 | 45.15536 | 535.0 | 161.0 | 24.13749 |
| 575.0 | 166.0 | 7.41905 | 620.0 | 171.0 | 2.06220 | 665.0 | 176.0 | .51632 |
| 705.0 | 181.0 | .04733 | 730.0 | 186.0 | .00114 | 745.0 | 191.0 | .00001 |
| 755.0 | 196.0 | .00000 | 755.0 | 201.0 | .00000 | 745.0 | 206.0 | .00000 |
| 730.0 | 211.0 | .00000 | 705.0 | 216.0 | .00000 | 690.0 | 221.0 | .00000 |
| 690.0 | 226.0 | .00000 | 690.0 | 231.0 | .00000 | 680.0 | 236.0 | .00000 |
| 665.0 | 241.0 | .00000 | 645.0 | 246.0 | .00000 | 615.0 | 251.0 | .00000 |
| 575.0 | 256.0 | .00000 | 530.0 | 261.0 | .00000 | 475.0 | 266.0 | .00000 |
| 410.0 | 271.0 | .00000 | 365.0 | 276.0 | .00000 | 365.0 | 286.0 | .00000 |
| 410.0 | 296.0 | .00000 | | | | | | |

FIGURE C-7. Listing of the table of the highest average concentration values computed at each receptor from Source 1 by the hypothetical potash processing plant concentration run.

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) -3000.0 | -2000.0 | -1500.0 | -1250.0 | -1000.0 |
|---|---|---|---|---|---|
| 3000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 2000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1500.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1250.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 800.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| .0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -800.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -1000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -1250.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 51, 1) |
| -1500.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -2000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -3000.0 / | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) |

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) -800.0 | -600.0 | -400.0 | -200.0 | .0 |
|---|---|---|---|---|---|
| 3000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 2000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1500.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1250.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 800.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| .0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | 1312.08510 ( 51, 1) |
| -400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 51, 1) | 445.53158 ( 51, 1) |
| -600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) | 213.74151 ( 51, 1) |
| -800.0 / | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00015 ( 51, 1) | 123.78426 ( 51, 1) |
| -1000.0 / | .00000 ( 0, 0) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00312 ( 51, 1) | 80.22895 ( 51, 1) |
| -1250.0 / | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .02560 ( 51, 1) | 53.40435 ( 51, 1) |
| -1500.0 / | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .08423 ( 51, 1) | 38.13016 ( 51, 1) |
| -2000.0 / | .00000 ( 51, 1) | .00000 ( 51, 1) | .00023 ( 51, 1) | .27959 ( 51, 1) | 22.23024 ( 51, 1) |
| -3000.0 / | .00000 ( 51, 1) | .00004 ( 51, 1) | .00989 ( 51, 1) | .60741 ( 51, 1) | 10.21603 ( 51, 1) |

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) 200.0 | 400.0 | 600.0 | 800.0 | 1000.0 |
|---|---|---|---|---|---|
| 3000.0 / | .00000 ( 0, 0) | 00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 2000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1500.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1250.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 800.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| .0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -200.0 / | 307.17259 ( 51, 1) | .00019 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -400.0 / | 7299.68060 ( 51, 1) | 75.55939 ( 51, 1) | .03632 ( 51, 1) | .00001 ( 51, 1) | .00000 ( 51, 1) |
| -600.0 / | 4195.57324 ( 51, 1) | 1210.95787 ( 51, 1) | 31.97048 ( 51, 1) | .15902 ( 51, 1) | .00053 ( 51, 1) |
| -800.0 / | 1543.19011 ( 51, 1) | 2395.10941 ( 51, 1) | 399.74551 ( 51, 1) | 17.24761 ( 51, 1) | .28272 ( 51, 1) |
| -1000.0 / | 602.26014 ( 51, 1) | 2078.45731 ( 51, 1) | 773.98994 ( 51, 1) | 162.50559 ( 51, 1) | 10.69934 ( 51, 1) |
| -1250.0 / | 327.54845 ( 51, 1) | 1196.73634 ( 51, 1) | 1293.01962 ( 51, 1) | 406.83203 ( 51, 1) | 109.67670 ( 51, 1) |
| -1500.0 / | 236.40061 ( 51, 1) | 638.11221 ( 51, 1) | 1084.91165 ( 51, 1) | 675.81922 ( 51, 1) | 256.72968 ( 51, 1) |
| -2000.0 / | 134.51301 ( 51, 1) | 178.84470 ( 51, 1) | 507.92512 ( 51, 1) | 680.26542 ( 51, 1) | 539.92424 ( 51, 1) |
| -3000.0 / | 49.74825 ( 51, 1) | 77.55591 ( 51, 1) | 86.98523 ( 51, 1) | 202.83957 ( 51, 1) | 300.43374 ( 51, 1) |

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 7299.68060 AND OCCURRED AT ( 200.0, -400.0) *

| Y-AXIS / (METERS) / | X-AXIS (METERS) 1250.0 | 1500.0 | 2000.0 | 3000.0 |
|---|---|---|---|---|
| 3000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 2000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1500.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1250.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 1000.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 800.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 600.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 400.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| 200.0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| .0 / | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -200.0 / | .00000 ( 51, 1) | .00000 ( 0, 0) | .00000 ( 0, 0) | .00000 ( 0, 0) |
| -400.0 / | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 0, 0) |
| -600.0 / | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -800.0 / | .00112 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -1000.0 / | .14874 ( 51, 1) | .00155 ( 51, 1) | .00000 ( 51, 1) | .00000 ( 51, 1) |
| -1250.0 / | 6.59717 ( 51, 1) | .19390 ( 51, 1) | .00010 ( 51, 1) | .00000 ( 51, 1) |
| -1500.0 / | 52.19542 ( 51, 1) | 4.42344 ( 51, 1) | .00887 ( 51, 1) | .00000 ( 51, 1) |
| -2000.0 / | 199.56811 ( 51, 1) | 84.66451 ( 51, 1) | 2.33336 ( 51, 1) | .00010 ( 51, 1) |
| -3000.0 / | 359.34361 ( 51, 1) | 279.02789 ( 51, 1) | 80.32959 ( 51, 1) | .93480 ( 51, 1) |

FIGURE C-7. (continued)

HIGH
24-HR
SGROUP# 1

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM SOURCES: 1,
* FOR THE DISCRETE RECEPTOR POINTS *

| - RNG - | - DIR - | CON. | (DAY,PER.) | - RNG - | - DIR - | CON. | (DAY,PER.) |
|---|---|---|---|---|---|---|---|
| 555.0 | 317.0 | .00000 | ( 0, 0) | 620.0 | 318.0 | .00000 | ( 0, 0) |
| 685.0 | 320.0 | .00000 | ( 0, 0) | 735.0 | 322.0 | .00000 | ( 0, 0) |
| 800.0 | 326.0 | .00000 | ( 0, 0) | 860.0 | 331.0 | .00000 | ( 0, 0) |
| 900.0 | 336.0 | .00000 | ( 0, 0) | 920.0 | 341.0 | .00000 | ( 0, 0) |
| 940.0 | 346.0 | .00000 | ( 0, 0) | 940.0 | 351.0 | .00000 | ( 0, 0) |
| 935.0 | 356.0 | .00000 | ( 0, 0) | 910.0 | 1.0 | .00000 | ( 0, 0) |
| 950.0 | 6.0 | .00000 | ( 0, 0) | 1015.0 | 11.0 | .00000 | ( 0, 0) |
| 1055.0 | 16.0 | .00000 | ( 0, 0) | 1075.0 | 21.0 | .00000 | ( 0, 0) |
| 1075.0 | 26.0 | .00000 | ( 0, 0) | 1045.0 | 31.0 | .00000 | ( 0, 0) |
| 995.0 | 36.0 | .00000 | ( 0, 0) | 910.0 | 41.0 | .00000 | ( 0, 0) |
| 855.0 | 43.0 | .00000 | ( 0, 0) | 755.0 | 45.0 | .00000 | ( 0, 0) |
| 620.0 | 47.0 | .00000 | ( 0, 0) | 525.0 | 49.0 | .00000 | ( 0, 0) |
| 460.0 | 51.0 | .00000 | ( 0, 0) | 355.0 | 56.0 | .00000 | ( 0, 0) |
| 355.0 | 66.0 | .00000 | ( 0, 0) | 355.0 | 76.0 | .00000 | ( 0, 0) |
| 355.0 | 86.0 | .00000 | ( 0, 0) | 350.0 | 96.0 | .00000 | ( 51, 1) |
| 345.0 | 106.0 | .00000 | ( 51, 1) | 335.0 | 116.0 | .00033 | ( 51, 1) |
| 325.0 | 126.0 | 2.18693 | ( 51, 1) | 380.0 | 136.0 | 252.87015 | ( 51, 1) |
| 420.0 | 141.0 | 1051.16232 | ( 51, 1) | 450.0 | 146.0 | 2513.70938 | ( 51, 1) |
| 480.0 | 151.0 | 4777.69031 | ( 51, 1) | 505.0 | 156.0 | 7180.53308 | ( 51, 1) |
| 535.0 | 161.0 | 5699.72913 | ( 51, 1) | 575.0 | 166.0 | 2798.85541 | ( 51, 1) |
| 620.0 | 171.0 | 1114.90518 | ( 51, 1) | 665.0 | 176.0 | 617.94398 | ( 51, 1) |
| 705.0 | 181.0 | 98.12818 | ( 51, 1) | 730.0 | 186.0 | 3.03500 | ( 51, 1) |
| 745.0 | 191.0 | .01474 | ( 51, 1) | 755.0 | 196.0 | .00001 | ( 51, 1) |
| 755.0 | 201.0 | .00000 | ( 51, 1) | 745.0 | 206.0 | .00000 | ( 51, 1) |
| 730.0 | 211.0 | .00000 | ( 51, 1) | 705.0 | 216.0 | .00000 | ( 51, 1) |
| 690.0 | 221.0 | .00000 | ( 0, 0) | 690.0 | 226.0 | .00000 | ( 0, 0) |
| 690.0 | 231.0 | .00000 | ( 0, 0) | 680.0 | 236.0 | .00000 | ( 0, 0) |
| 665.0 | 241.0 | .00000 | ( 0, 0) | 645.0 | 246.0 | .00000 | ( 0, 0) |
| 615.0 | 251.0 | .00000 | ( 0, 0) | 575.0 | 256.0 | .00000 | ( 0, 0) |
| 530.0 | 261.0 | .00000 | ( 0, 0) | 475.0 | 266.0 | .00000 | ( 0, 0) |
| 410.0 | 271.0 | .00000 | ( 0, 0) | 365.0 | 276.0 | .00000 | ( 0, 0) |
| 365.0 | 286.0 | .00000 | ( 0, 0) | 410.0 | 296.0 | .00000 | ( 0, 0) |

FIGURE C-8. Listing of the table of the maximum 50 average concentration values computed from Sources 12 to 15 by the hypothetical potash processing plant concentration run.

MAX 50
24-HR
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 50 MAXIMUM 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM SOURCES: 12, -15,

| RANK | CON. | PER. | DAY | X OR RANGE (METERS) | Y(METERS) OR DIRECTION (DEGREES) | RANK | CON. | PER. | DAY | X OR RANGE (METERS) | Y(METERS) OR DIRECTION (DEGREES) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 279.48573 | 1 | 51 | 325.0 | 126.0 | 26 | 21.82375 | 1 | 51 | 1250.0 | -2000.0 |
| 2 | 268.55373 | 1 | 51 | 330.0 | 136.0 | 27 | 19.59296 | 1 | 51 | 1500.0 | -3000.0 |
| 3 | 220.75506 | 1 | 51 | 420.0 | 141.0 | 28 | 18.57100 | 1 | 51 | 400.0 | -1250.0 |
| 4 | 211.57320 | 1 | 51 | 200.0 | -200.0 | 29 | 18.41441 | 1 | 51 | 1250.0 | -3000.0 |
| 5 | 149.28621 | 1 | 51 | 450.0 | 146.0 | 30 | 16.77151 | 1 | 51 | 800.0 | -800.0 |
| 6 | 146.76246 | 1 | 51 | 400.0 | -600.0 | 31 | 15.22239 | 1 | 51 | 1000.0 | -3000.0 |
| 7 | 129.94168 | 1 | 51 | 400.0 | -400.0 | 32 | 13.79556 | 1 | 51 | 600.0 | -2000.0 |
| 8 | 90.19569 | 1 | 51 | 400.0 | -800.0 | 33 | 13.27117 | 1 | 51 | 1250.0 | -1500.0 |
| 9 | 83.06282 | 1 | 51 | 600.0 | -1000.0 | 34 | 13.26752 | 1 | 51 | 200.0 | -600.0 |
| 10 | 78.51823 | 1 | 51 | 480.0 | 151.0 | 35 | 12.41379 | 1 | 51 | 1500.0 | -2000.0 |
| 11 | 73.74287 | 1 | 51 | 600.0 | -800.0 | 36 | 11.31163 | 1 | 51 | 535.0 | 161.0 |
| 12 | 64.76668 | 1 | 51 | 335.0 | 116.0 | 37 | 8.47299 | 1 | 51 | 400.0 | -1500.0 |
| 13 | 61.05610 | 1 | 51 | 600.0 | -1250.0 | 38 | 8.39733 | 1 | 51 | 2000.0 | -3000.0 |
| 14 | 50.99602 | 1 | 51 | 800.0 | -1500.0 | 39 | 7.91083 | 1 | 51 | 1000.0 | -1000.0 |
| 15 | 50.14821 | 1 | 51 | 800.0 | -1250.0 | 40 | 7.13839 | 1 | 51 | 200.0 | -800.0 |
| 16 | 46.60481 | 1 | 51 | 400.0 | -1000.0 | 41 | 6.53760 | 1 | 51 | 800.0 | -3000.0 |
| 17 | 41.08075 | 1 | 51 | 600.0 | -1500.0 | 42 | 5.08344 | 1 | 51 | 400.0 | -200.0 |
| 18 | 40.94308 | 1 | 51 | 600.0 | -600.0 | 43 | 4.54630 | 1 | 51 | 200.0 | -1000.0 |
| 19 | 40.91343 | 1 | 51 | 200.0 | -400.0 | 44 | 3.81649 | 1 | 51 | 575.0 | 166.0 |
| 20 | 36.20046 | 1 | 51 | 800.0 | -1000.0 | 45 | 3.69604 | 1 | 51 | 1250.0 | -1250.0 |
| 21 | 34.87407 | 1 | 51 | 1000.0 | -2000.0 | 46 | 3.54489 | 1 | 51 | 400.0 | -2000.0 |
| 22 | 30.88540 | 1 | 51 | 505.0 | 156.0 | 47 | 2.88374 | 1 | 51 | 200.0 | -1250.0 |
| 23 | 30.84629 | 1 | 51 | 800.0 | -2000.0 | 48 | 2.24696 | 1 | 51 | 600.0 | -3000.0 |
| 24 | 30.24997 | 1 | 51 | 1000.0 | -1500.0 | 49 | 2.01586 | 1 | 51 | 600.0 | -400.0 |
| 25 | 23.30838 | 1 | 51 | 1000.0 | -1250.0 | 50 | 2.00615 | 1 | 51 | 1500.0 | -1500.0 |

Figure C-6. The format of this table is similar to the tables produced by the ISW(16) option mentioned above. Figure C-7 shows the content and format of a highest concentration table produced by the ISW(17) option. The content includes the highest average concentration values calculated for all receptors as well as the day and time period when each value occurred. In this case, only one averaging period is possible per day and a "1" is printed for the averaging period. The second-highest table (not shown) is identical in format to the highest concentration table. Option ISW(18) generates the maximum 50 tables, an example of which is shown in Figure C-8.

## C.3 Example Dry Deposition Run

Because the preparation of a total deposition run is very similar to the preparation of the average concentration run discussed in the preceding section, only the differences between the two runs are discussed in this section. The primary difference between the two runs is that the deposition model requires all sources to have gravitational settling categories (parameter NVS > 0). If the program detects any sources which do not have any gravitational settling categories, the program prints the error message shown in Figure 3-2(d) and terminates the run. As mentioned in Section 2.6, it is desired to obtain an estimate of the dry deposition of fugitive emissions from the ore pile (Source 1) and the conveyor belt (Sources 2-11). Hence, this example run excludes the roof monitor (Sources 12-15) and the stack (Source 16) which were modeled for concentration in the preceding section.

Figure C-9 shows the 130 lines of card input data values required to compute the desired total deposition values for the hypothetical potash processing plant. Three differences between this deposition run and the concentration run are noted in Card Group 2, which consists of the second and the third lines of Figure C-9 according to Table 3-4. One difference is that

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | | 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
| 1 | 1 | -- HYPOTHETICAL POTASH PROCESSING PLANT - |
| 2 | 2 | 2 1 2 0 0 2 1 1 1 1 1 1 0 1 1 0 2 1 2 2 2 2 2 0 |
| | 3 | 11 19 19 64 3 |
| 3 | 4 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 5 | -200 0 200 400 600 800 1000 1250 |
| | 6 | 1500 2000 3000 |
| | 7 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 8 | -200 0 200 400 600 800 1000 1250 |
| | 9 | 1500 2000 3000 |
| | 10 | 555.0 317.0 |
| | 11 | 620.0 318.0 |
| | 12 | 685.0 320.0 |
| | 13 | 735.0 322.0 |
| | 14 | 800.0 326.0 |
| | 15 | 860.0 331.0 |
| | 16 | 900.0 336.0 |
| | 17 | 920.0 341.0 |
| | 18 | 940.0 346.0 |
| | 19 | 940.0 351.0 |
| | 20 | 935.0 356.0 |
| | 21 | 910.0 1.0 |
| | 22 | 950.0 6.0 |
| | 23 | 1015.0 11.0 |
| | 24 | 1055.0 16.0 |
| | 25 | 1075.0 21.0 |
| | 26 | 1075.0 26.0 |
| | 27 | 1045.0 31.0 |
| | 28 | 995.0 36.0 |
| | 29 | 910.0 41.0 |
| | 30 | 855.0 43.0 |
| | 31 | 755.0 45.0 |
| | 32 | 620.0 47.0 |
| | 33 | 525.0 49.0 |
| | 34 | 460.0 51.0 |
| | 35 | 355.0 56.0 |
| | 36 | 355.0 66.0 |
| | 37 | 355.0 76.0 |
| | 38 | 355.0 86.0 |
| | 39 | 350.0 96.0 |
| | 40 | 345.0 106.0 |
| | 41 | 335.0 116.0 |
| | 42 | 325.0 126.0 |
| | 43 | 380.0 136.3 |
| | 44 | 420.0 141.0 |
| | 45 | 450.0 146.0 |
| | 46 | 480.0 151.0 |
| | 47 | 505.0 156.0 |
| | 48 | 535.0 161.0 |
| | 49 | 575.0 166.0 |

Figure C-9. Card input data values for the hypothetical potash processing plant deposition run.

| CARD GROUP | CARD NUMBER | CARD COLUMN 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
|---|---|---|
| | 50 | 620.0 171.0 |
| | 51 | 665.0 176.0 |
| | 52 | 705.0 181.0 |
| | 53 | 730.0 186.0 |
| | 54 | 745.0 191.0 |
| | 55 | 755.0 196.0 |
| | 56 | 755.0 201.0 |
| | 57 | 745.0 206.0 |
| | 58 | 730.0 211.0 |
| | 59 | 705.0 216.0 |
| | 60 | 690.0 221.0 |
| | 61 | 690.0 226.0 |
| | 62 | 690.0 231.0 |
| | 63 | 680.0 236.0 |
| | 64 | 665.0 241.0 |
| | 65 | 645.0 246.0 |
| | 66 | 615.0 251.0 |
| | 67 | 575.0 256.0 |
| | 68 | 530.0 261.0 |
| | 69 | 475.0 266.0 |
| | 70 | 410.0 271.0 |
| | 71 | 365.0 276.0 |
| | 72 | 365.0 286.0 |
| | 73 | 410.0 296.0 |
| 4 | 74 | 1 2 2 |
| | 75 | 1 2 -11 1 -11 |
| 5 | 76 | |
| | 77 | |
| | 78 | 1 |
| | 79 | |
| | 80 | |
| | 81 | |
| | 82 | |
| | 83 | 14713 64 14918 64 |
| 6 | 84 | 12 63 360. -13.3 -13.3 0 10.0 26.6 |
| | 85 | .1 .4 .28 .12 .06 .04 |
| | 86 | .001 .007 .019 .037 .061 .099 |
| | 87 | 1.0 .82 .72 .65 .59 .5 |
| | 88 | 21 60 468. 20 0 0 .9 1 4.7 |
| | 89 | .1 .4 .28 .12 .06 .04 |
| | 90 | .001 .007 .019 .037 .061 .099 |
| | 91 | 1.0 .82 .72 .65 .59 .5 |
| | 92 | 31 60 468. 30 0 0 2.6 1 4.7 |
| | 93 | .1 .4 .28 .12 .06 .04 |
| | 94 | .001 .007 .019 .037 .061 .099 |
| | 95 | 1.0 .82 .72 .65 .59 .5 |
| | 96 | 41 60 468. 40 0 0 4.3 1 4.7 |
| | 97 | .1 .4 .28 .12 .06 .04 |
| | 98 | .001 .007 .019 .037 .061 .099 |

Figure C-9. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | | | | |
| | 99 | | 1.0 | | .82 | | .72 | | .65 | | .59 | | .5 | | | | | | | | |
| | 100 | 51 | 60 | | 468. | | 49 | | 0 | 0 | 6.1 | | 1 | 4.7 | | | | | | | |
| | 101 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 102 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 103 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 104 | 61 | 60 | | 468. | | 59 | | 0 | 0 | 7.8 | | 1 | 4.7 | | | | | | | |
| | 105 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 106 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 107 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 108 | 71 | 60 | | 468. | | 69 | | 0 | 0 | 9.6 | | 1 | 4.7 | | | | | | | |
| | 109 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 110 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 111 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 112 | 81 | 60 | | 468. | | 79 | | 0 | 0 | 11.3 | | 1 | 4.7 | | | | | | | |
| | 113 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 114 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 115 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 116 | 91 | 60 | | 468. | | 89 | | 0 | 0 | 13.0 | | 1 | 4.7 | | | | | | | |
| | 117 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 118 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 119 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 120 | 101 | 60 | | 468. | | 99 | | 0 | 0 | 14.8 | | 1 | 4.7 | | | | | | | |
| | 121 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 122 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 123 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 124 | 111 | 60 | | 468. | | 109 | | 0 | 0 | 16.5 | | 1 | 4.7 | | | | | | | |
| | 125 | | .1 | | .4 | | .28 | | | .12 | | | .06 | | .04 | | | | | | |
| | 126 | | .001 | | .007 | | .019 | | | .037 | | | .061 | | .099 | | | | | | |
| | 127 | | 1.0 | | .82 | | .72 | | | .65 | | | .59 | | .5 | | | | | | |
| | 128 | | 1 | | 1 | | 1 | | | 1 | | | 1 | | 1 | | | 1 | | | 5 |
| | 129 | | 5 | | 5 | | 5 | | | 5 | | | 5 | | 5 | | | 5 | | | 1 |
| | 130 | | 1 | | 1 | | 1 | | | 1 | | | 1 | | 1 | | | 1 | | | 1 |

Figure C-9. (Continued)

ISW(1) equals "2" to indicate to the program to compute deposition. The second difference is that NSOURC equals "11" since the roof monitor (Sources 12-15) and the stack (Source 16) are not modeled for deposition. Third, because of the fewer number of sources, there are fewer source groups; hence, NGROUP equals "3." Furthermore, Card Group 4 is different because of fewer source groups. As indicated by the values contained in Card Group 4 shown in Figure C-9, it is desired to see the total deposition contributions from the ore pile (Source 1), the conveyor belt (Sources 2-11) and both the ore pile and conveyor belt. A preliminary estimate of the magnitude of the total deposition values indicated that the desired output units be in grams per square meter, the program's default units for deposition calculations. Because there are only 11 sources in this example, Card Group 6 contains source data values for 11 sources instead of the 16 sources used in the example concentration run. Note that the total hourly emissions in grams for the eleven sources are a factor of 3600 times larger than the average emission rates in grams per second used to compute average concentration (refer to Section 2.4.3 for an explanation of emission rates for deposition calculations).

Only the "50 maximum" table (Figure C-10) of the print output produced by this deposition example run is shown because the format of the output tables are the same as those of the concentration example run discussed in the preceding section. The only exceptions are in the heading where the words "AVERAGE CONCENTRATION" are replaced by "TOTAL DEPOSITION" and the output units are (GRAMS/SQUARE METER) instead of (MICROGRAMS/CUBIC METER).

FIGURE C-10. Listing of the table of the maximum 50 average concentration values computed from Sources I to II by the hypothetical potash processing plant concentration run.

MAX 50
24-HR
SGROUP# 3

*** -- HYPOTHETICAL POTASH PROCESSING PLANT - CONCENTRATION -- ***

* 50 MAXIMUM 24-HOUR TOTAL DEPOSITION (GRAMS/SQUARE METER *

* FROM SOURCES: 1, -11,

| RANK | DEP. | PER. | DAY | X OR RANGE (METERS) | Y(METERS) OR DIRECTION (DEGREES) | RANK | DEP. | PER. | DAY | X OR RANGE (METERS) | Y(METERS) OR DIRECTION (DEGREES) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18.44659 | 1 | 51 | 200.0 | -400.0 | 26 | .45011 | 1 | 51 | 600.0 | -800.0 |
| 2 | 16.09612 | 1 | 51 | 505.0 | 156.0 | 27 | .40013 | 1 | 51 | 800.0 | -2000.0 |
| 3 | 12.20186 | 1 | 51 | 535.0 | 161.0 | 28 | .39935 | 1 | 51 | .0 | -600.0 |
| 4 | 11.30931 | 1 | 51 | 480.0 | 151.0 | 29 | .31862 | 1 | 51 | 800.0 | -1250.0 |
| 5 | 7.88501 | 1 | 51 | .0 | -200.0 | 30 | .30122 | 1 | 51 | 1000.0 | -2000.0 |
| 6 | 7.56966 | 1 | 51 | 200.0 | -600.0 | 31 | .29673 | 1 | 51 | 600.0 | -2000.0 |
| 7 | 6.33068 | 1 | 51 | 450.0 | 146.0 | 32 | .29087 | 1 | 51 | 200.0 | -1250.0 |
| 8 | 5.29350 | 1 | 51 | 575.0 | 166.0 | 33 | .18140 | 1 | 51 | 200.0 | -1500.0 |
| 9 | 3.03669 | 1 | 51 | 400.0 | -800.0 | 34 | .17501 | 1 | 51 | .0 | -800.0 |
| 10 | 2.93984 | 1 | 51 | 420.0 | 141.0 | 35 | .16870 | 1 | 51 | 1000.0 | -1500.0 |
| 11 | 2.19844 | 1 | 51 | 400.0 | -1000.0 | 36 | .16698 | 1 | 51 | 400.0 | -400.0 |
| 12 | 2.03710 | 1 | 51 | 200.0 | -800.0 | 37 | .15712 | 1 | 51 | 705.0 | 181.0 |
| 13 | 1.98672 | 1 | 51 | 620.0 | 171.0 | 38 | .15549 | 1 | 51 | 1250.0 | -3000.0 |
| 14 | 1.89310 | 1 | 51 | 400.0 | -600.0 | 39 | .14997 | 1 | 51 | 800.0 | -1000.0 |
| 15 | 1.43739 | 1 | 51 | 200.0 | -200.0 | 40 | .13255 | 1 | 51 | 1000.0 | -3000.0 |
| 16 | 1.25203 | 1 | 51 | .0 | -400.0 | 41 | .11608 | 1 | 51 | 1500.0 | -3000.0 |
| 17 | 1.07066 | 1 | 51 | 600.0 | -1250.0 | 42 | .10678 | 1 | 51 | 1250.0 | -2000.0 |
| 18 | 1.04983 | 1 | 51 | 400.0 | -1250.0 | 43 | .10375 | 1 | 51 | 400.0 | -2000.0 |
| 19 | 1.03835 | 1 | 51 | 665.0 | 176.0 | 44 | .08902 | 1 | 51 | .0 | -1000.0 |
| 20 | .83924 | 1 | 51 | 380.0 | 136.0 | 45 | .08503 | 1 | 51 | 800.0 | -3000.0 |
| 21 | .80653 | 1 | 51 | 600.0 | -1500.0 | 46 | .08327 | 1 | 51 | 1000.0 | -1250.0 |
| 22 | .75775 | 1 | 51 | 600.0 | -1000.0 | 47 | .08205 | 1 | 51 | 200.0 | -2000.0 |
| 23 | .63566 | 1 | 51 | 200.0 | -1000.0 | 48 | .04869 | 1 | 51 | .0 | -1250.0 |
| 24 | .47381 | 1 | 51 | 800.0 | -1500.0 | 49 | .04645 | 1 | 51 | 600.0 | -600.0 |
| 25 | .46416 | 1 | 51 | 400.0 | -1500.0 | 50 | .04327 | 1 | 51 | 1500.0 | -2000.0 |

APPENDIX D

# EXAMPLE EXECUTIONS OF THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

## D.1 Introduction

The following examples are problem runs using the ISC long-term (ISCLT) program to model the hypothetical potash processing plant described in Section 2.6. The examples consist of two executions of the ISCLT program. The first problem is to calculate annual average particulate concentrations and the second problem is to calculate total annual ground-level deposition. This appendix assumes the user is familiar with the example hypothetical processing plant discussed in Section 2.6 of the main body of the text.

## D.2 Example Concentration Run

This program example run calculates the annual average particulate concentrations produced by emissions from the hypothetical potash processing plant described in Section 2.6 and shown in Figure 2-11. The hypothetical plant is modeled as 16 sources: one stack source, fourteen volume sources (roof monitor and conveyor belt) and one area source (ore pile). These sources are placed at the approximate center of the receptor grid system. Because we are only interested in the annual average particulate concentrations produced by these sources, annual meteorological data are used. The annual meteorological inputs as well as required program control data are explained in Section D.2.1 and D.2.2.

### D.2.1 Input Data Set-Up Procedure

This example run requires the input data shown in the example runstream in Figure D-1. An explanation of each card group in Figure D-1 is given in Sections D.2.1.a. through D.2.1.m. below.

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | | 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
| 1 | 1 | HYPOTHETICAL POTASH PROCESSING PLANT |
| 2 | 2 | 1 2 1 3 2 3 3 2 2 1 1 1 1 1 0 |
| 3 | 3 | 16 5 19 19 1 |
| 4 | 4 | 1 2 2 1 1 |
| 4a | 5 | 1 2 -11 12 -15 16 -16 |
| 5 | 6 | |
| 6 | 7 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 8 | -200 0 200 400 600 800 1000 1250 |
| | 9 | 1500 2000 3000 |
| 7 | 10 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 11 | -200 0 200 400 600 800 1000 1250 |
| | 12 | 1500 2000 3000 |
| 6a 7a | 13 | 2108.0 14.0 |
| 9a | 14 | .0001485 .0000856 .0000000 .0000000 .0000000 .0000000 |
| | 15 | .0001283 .0001993 .0000000 .0000000 .0000000 .0000000 |
| | 16 | .0003918 .0001998 .0000000 .0000000 .0000000 .0000000 |
| | 17 | .0001076 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 18 | .0003119 .0005995 .0000000 .0000000 .0000000 .0000000 |
| | 19 | .0003611 .0005139 .0000000 .0000000 .0000000 .0000000 |
| | 20 | .0003265 .0003426 .0000000 .0000000 .0000000 .0000000 |
| | 21 | .0006953 .0007993 .0000000 .0000000 .0000000 .0000000 |
| | 22 | .0006747 .0008564 .0000000 .0000000 .0000000 .0000000 |
| | 23 | .0005512 .0005424 .0000000 .0000000 .0000000 .0000000 |
| | 24 | .0001441 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 25 | .0001155 .0000855 .0000000 .0000000 .0000000 .0000000 |
| | 26 | .0002969 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 27 | .0000839 .0001713 .0000000 .0000000 .0000000 .0000000 |
| | 28 | .0000602 .0000856 .0000000 .0000000 .0000000 .0000000 |
| | 29 | .0002820 .0002284 .0000000 .0000000 .0000000 .0000000 |
| | 30 | .0007353 .0007708 .0005710 .0000000 .0000000 .0000000 |
| | 31 | .0010483 .0010848 .0004653 .0000000 .0000000 .0000000 |
| | 32 | .0004444 .0006851 .0001998 .0000000 .0000000 .0000000 |
| | 33 | .0009629 .0014845 .0008564 .0000000 .0000000 .0000000 |
| | 34 | .0018775 .0027977 .0016843 .0000000 .0000000 .0000000 |
| | 35 | .0016892 .0027977 .0027691 .0000000 .0000000 .0000000 |
| | 36 | .0019770 .0031688 .0034257 .0000000 .0000000 .0000000 |
| | 37 | .0026238 .0039967 .0042536 .0000000 .0000000 .0000000 |
| | 38 | .0045918 .0042251 .0028548 .0000000 .0000000 .0000000 |
| | 39 | .0026274 .0030832 .0010563 .0000000 .0000000 .0000000 |
| | 40 | .0014567 .0010848 .0006291 .0000000 .0000000 .0000000 |
| | 41 | .0016527 .0021125 .0007137 .0000000 .0000000 .0000000 |
| | 42 | .0024999 .0021125 .0011134 .0000000 .0000000 .0000000 |
| | 43 | .0013425 .0011990 .0007703 .0000000 .0000000 .0000000 |
| | 44 | .0009151 .0006851 .0004568 .0000000 .0000000 .0000000 |
| | 45 | .0007325 .0007422 .0003711 .0000000 .0000000 .0000000 |
| | 46 | .0004645 .0009421 .0012561 .0001427 .0000285 .0000000 |
| | 47 | .0006990 .0007993 .0015130 .0004853 .0001427 .0000285 |
| | 48 | .0002668 .0007422 .0009421 .0004282 .0000285 .0000000 |
| | 49 | .0005317 .0014559 .0015701 .0004282 .0000571 .0000000 |
| | 50 | .0006882 .0027977 .0058523 .0007137 .0000856 .0000000 |

Figure D-1. Card input data values for the hypothetical potash processing plant concentration run.

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| CARD GROUP | CARD NUMBER | CARD COLUMN | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| | 51 | .0006961 | .0037683 | .0069657 | .0021125 | .0001427 | .0000000 | | | | | | | | | | |
| | 52 | .0005842 | .0030546 | .0075652 | .0031688 | .0001713 | .0000000 | | | | | | | | | | |
| | 53 | .0006083 | .0042536 | .0081076 | .0025978 | .0001998 | .0000000 | | | | | | | | | | |
| | 54 | .0011771 | .0040823 | .0051101 | .0006281 | .0001142 | .0000285 | | | | | | | | | | |
| | 55 | .0007716 | .0035399 | .0024551 | .0002569 | .0001142 | .0000856 | | | | | | | | | | |
| | 56 | .0006050 | .0016272 | .0020269 | .0004568 | .0000856 | .0001427 | | | | | | | | | | |
| | 57 | .0009245 | .0038539 | .0028833 | .0005139 | .0001713 | .0003426 | | | | | | | | | | |
| | 58 | .0014135 | .0043964 | .0059665 | .0011134 | .0002855 | .0003426 | | | | | | | | | | |
| | 59 | .0008536 | .0021125 | .0033972 | .0005139 | .0002569 | .0002284 | | | | | | | | | | |
| | 60 | .0003503 | .0010563 | .0013417 | .0001713 | .0000571 | .0000285 | | | | | | | | | | |
| | 61 | .0006561 | .0010563 | .0009421 | .0001142 | .0000571 | .0000000 | | | | | | | | | | |
| | 62 | .0009550 | .0025978 | .0079077 | .0136744 | .0112764 | .0102772 | | | | | | | | | | |
| | 63 | .0006897 | .0027406 | .0088784 | .0134745 | .0080790 | .0050530 | | | | | | | | | | |
| | 64 | .0003984 | .0016843 | .0065945 | .0055383 | .0020554 | .0005424 | | | | | | | | | | |
| | 65 | .0008488 | .0040823 | .0036214 | .0061663 | .0011419 | .0001993 | | | | | | | | | | |
| | 66 | .0019828 | .0061949 | .0149019 | .0124754 | .0019412 | .0002284 | | | | | | | | | | |
| | 67 | .0013395 | .0053394 | .0166148 | .0184133 | .0032259 | .0004853 | | | | | | | | | | |
| | 68 | .0007174 | .0035399 | .0090782 | .0119044 | .0017129 | .0001998 | | | | | | | | | | |
| | 69 | .0009847 | .0034257 | .0065945 | .0070228 | .0011990 | .0002569 | | | | | | | | | | |
| | 70 | .0010097 | .0037683 | .0046818 | .0045105 | .0012561 | .0006281 | | | | | | | | | | |
| | 71 | .0005797 | .0029119 | .0021411 | .0034257 | .0013132 | .0004853 | | | | | | | | | | |
| | 72 | .0004950 | .0013703 | .0022553 | .0034543 | .0019983 | .0012561 | | | | | | | | | | |
| | 73 | .0005598 | .0017985 | .0050530 | .0058809 | .0028540 | .0020840 | | | | | | | | | | |
| | 74 | .0012231 | .0045962 | .0091353 | .0148443 | .0079077 | .0057667 | | | | | | | | | | |
| | 75 | .0006980 | .0020269 | .0074224 | .0141597 | .0101190 | .0068965 | | | | | | | | | | |
| | 76 | .0005355 | .0018842 | .0051101 | .0075937 | .0029404 | .0019412 | | | | | | | | | | |
| | 77 | .0007400 | .0021696 | .0065374 | .0055954 | .0026264 | .0015987 | | | | | | | | | | |
| | 78 | .0000000 | .0052528 | .0095064 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 79 | .0000000 | .0032544 | .0076794 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 80 | .0000000 | .0017700 | .0057096 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 81 | .0000000 | .0033686 | .0075937 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 82 | .0000000 | .0049673 | .0097062 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 83 | .0000000 | .0027406 | .0056239 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 84 | .0000000 | .0017700 | .0027406 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 85 | .0000000 | .0023695 | .0018271 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 86 | .0000000 | .0024551 | .0015701 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 87 | .0000000 | .0018271 | .0013132 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 88 | .0000000 | .0016558 | .0019983 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 89 | .0000000 | .0034257 | .0055383 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 90 | .0000000 | .0066802 | .0111622 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 91 | .0000000 | .0049959 | .0070228 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 92 | .0000000 | .0035685 | .0063091 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 93 | .0000000 | .0052242 | .0089925 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 94 | .0066412 | .0097348 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 95 | .0037307 | .0055954 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 96 | .0024779 | .0043107 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 97 | .0028384 | .0049388 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 98 | .0047532 | .0077364 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 99 | .0030647 | .0049102 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 100 | .0032044 | .0028262 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 101 | .0035623 | .0023695 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 102 | .0047073 | .0031688 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 103 | .0048615 | .0041680 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 104 | .0029674 | .0034257 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 105 | .0059074 | .0094493 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 106 | .0117078 | .0205544 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 107 | .0074283 | .0120472 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |

Figure D-1. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| | 108 | .0062942 | | .0098204 | | .0000000 | | .0000000 | | .0000000 | | .0000000 | | | | | |
| | 109 | .0076137 | | .0128180 | | .0000000 | | .0000000 | | .0000000 | | .0000000 | | | | | |
| 10 | 110 | 287.2 | | 287.2 | | 283.2 | | 280.8 | | 279.1 | | 279.1 | | | | | |
| 11 | 111 | 1730 | | 1730 | | | | | | | | | | | | | |
| | 112 | 1730 | | 1730 | | 1730 | | | | | | | | | | | |
| | 113 | 960 | | 1025 | | 1235 | | 1295 | | 1295 | | 1295 | | | | | |
| | 114 | 320 | | 500 | | 840 | | 840 | | 840 | | 840 | | | | | |
| | 115 | | | | | | | | | | | | | | | | |
| | 116 | | | | | | | | | | | | | | | | |
| 12 | 117 | | | | | | | | | | | | | | | | |
| | 118 | | | | | | | | | | | | | | | | |
| | 119 | | | | | | | | | | | | | | | | |
| | 120 | | | | | | | | | | | | | | | | |
| | 121 | | | | | | | | | | | | | | | | |
| | 122 | | | | | | | | | | | | | | | | |
| 13 | 123 | | | | | | | | | | | | | | | | |
| 14 | 124 | | | | | | | | | | | | | | | | |
| 15 | 125 | | | | | | | | | | | | | | | | |
| | 126 | | | | | | | | | | | | | | | | |
| 16 | 127 | | | | | | | | | | | | | | | | |
| | 128 | | | | | | | | | | | | | | | | |
| | 129 | | | | | | | | | | | | | | | | |
| | 130 | | | | | | | | | | | | | | | | |
| | 131 | | | | | | | | | | | | | | | | |
| | 132 | | | | | | | | | | | | | | | | |
| 17 | 133 | 1 23 | | -13.3 | | -13.3 | | 10 | | 26.6 | | | | | | | 6 |
| | 134 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | |
| | 135 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | |
| | 136 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | |
| | 137 | .40 | | .50 | | | | | | | | | | | | | |
| | 138 | .30 | | .40 | | .50 | | | | | | | | | | | |
| | 139 | .20 | | .30 | | .40 | | .50 | | .70 | | 1.0 | | | | | |
| | 140 | .10 | | .25 | | .50 | | .50 | | .70 | | 1.0 | | | | | |
| | 141 | | | .20 | | .25 | | | | | | | | | | | |
| | 142 | .05 | | .10 | | | | | | | | | | | | | |
| | 143 | 2 13 | | 20 | | 0 | | .9 | | 4.7 | | 1.0 | | | | | 6 |
| | 144 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | |
| | 145 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | |
| | 146 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | |
| | 147 | .13 | | .16 | | | | | | | | | | | | | |
| | 148 | .10 | | .13 | | .16 | | | | | | | | | | | |
| | 149 | .08 | | .12 | | .14 | | .16 | | .19 | | .22 | | | | | |
| | 150 | .04 | | .10 | | .13 | | .16 | | .19 | | .22 | | | | | |
| | 151 | | | .08 | | .10 | | | | | | | | | | | |
| | 152 | .02 | | .05 | | | | | | | | | | | | | |
| | 153 | 3 13 | | 30 | | 0 | | 2.6 | | 4.7 | | 1.0 | | | | | 6 |
| | 154 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | |
| | 155 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | |
| | 156 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | |
| | 157 | .13 | | .16 | | | | | | | | | | | | | |
| | 158 | .10 | | .13 | | .16 | | | | | | | | | | | |
| | 159 | .08 | | .12 | | .14 | | .16 | | .19 | | .22 | | | | | |
| | 160 | .04 | | .10 | | .13 | | .16 | | .19 | | .22 | | | | | |
| | 161 | | | .08 | | .10 | | | | | | | | | | | |
| | 162 | .02 | | .05 | | | | | | | | | | | | | |
| | 163 | 4 13 | | 40 | | 0 | | 4.3 | | 4.7 | | 1.0 | | | | | 6 |
| | 164 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | |

Figure D-1. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | 165 | .10 .40 .28 .12 .06 .04 |
| | 166 | 1.0 .82 .72 .65 .59 .50 |
| | 167 | .13 .16 |
| | 168 | .10 .13 .16 |
| | 169 | .08 .12 .14 .16 .19 .22 |
| | 170 | .04 .10 .13 .16 .19 .22 |
| | 171 | .08 .10 |
| | 172 | .02 .05 |
| | 173 | 5 13 49 0 6.1 4.7 1.0 6 |
| | 174 | .001 .007 .019 .037 .061 .099 |
| | 175 | .10 .40 .28 .12 .06 .04 |
| | 176 | 1.0 .82 .72 .65 .59 .50 |
| | 177 | .13 .16 |
| | 178 | .10 .13 .16 |
| | 179 | .08 .12 .14 .16 .19 .22 |
| | 180 | .04 .10 .13 .16 .19 .22 |
| | 181 | .08 .10 |
| | 182 | .02 .05 |
| | 183 | 6 13 59 0 7.8 4.7 1.0 6 |
| | 184 | .001 .007 .019 .037 .061 .099 |
| | 185 | .10 .40 .28 .12 .06 .04 |
| | 186 | 1.0 .82 .72 .65 .59 .50 |
| | 187 | .13 .16 |
| | 188 | .10 .13 .16 |
| | 189 | .08 .12 .14 .16 .19 .22 |
| | 190 | .04 .10 .13 .16 .19 .22 |
| | 191 | .08 .10 |
| | 192 | .02 .05 |
| | 193 | 7 13 69 0 9.6 4.7 1.0 6 |
| | 194 | .001 .007 .019 .037 .061 .099 |
| | 195 | .10 .40 .28 .12 .06 .04 |
| | 196 | 1.0 .82 .72 .65 .59 .50 |
| | 197 | .13 .16 |
| | 198 | .10 .13 .16 |
| | 199 | .08 .12 .14 .16 .19 .22 |
| | 200 | .04 .10 .13 .16 .19 .22 |
| | 201 | .08 .10 |
| | 202 | .02 .05 |
| | 203 | 8 13 79 0 11.3 4.7 1.0 6 |
| | 204 | .001 .007 .019 .037 .061 .099 |
| | 205 | .10 .40 .28 .12 .06 .04 |
| | 206 | 1.0 .82 .72 .65 .59 .50 |
| | 207 | .13 .16 |
| | 208 | .10 .13 .16 |
| | 209 | .08 .12 .14 .16 .19 .22 |
| | 210 | .04 .10 .13 .16 .19 .22 |
| | 211 | .08 .10 |
| | 212 | .02 .05 |
| | 213 | 9 13 89 0 13.0 4.7 1.0 6 |
| | 214 | .001 .007 .019 .037 .061 .099 |
| | 215 | .10 .40 .28 .12 .06 .04 |
| | 216 | 1.0 .82 .72 .65 .59 .50 |
| | 217 | .13 .16 |
| | 218 | .10 .13 .16 |
| | 219 | .08 .12 .14 .16 .19 .22 |
| | 220 | .04 .10 .13 .16 .19 .22 |
| | 221 | .08 .10 |

Figure D-1. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | 222 | .02 .05 |
| | 223 | 10 13 99 0 14.8 4.7 1.0 6 |
| | 224 | .001 .007 .019 .037 .061 .099 |
| | 225 | .10 .40 .28 .12 .06 .04 |
| | 226 | 1.0 .82 .72 .65 .59 .50 |
| | 227 | .13 .16 |
| | 228 | .10 .13 .16 |
| | 229 | .08 .12 .14 .16 .19 .22 |
| | 230 | .04 .10 .13 .16 .19 .22 |
| | 231 | .08 .10 |
| | 232 | .02 .05 |
| | 233 | 11 13 109 0 16.5 4.7 1.0 6 |
| | 234 | .001 .007 .019 .037 .061 .099 |
| | 235 | .10 .40 .28 .12 .06 .04 |
| | 236 | 1.0 .82 .72 .65 .59 .50 |
| | 237 | .13 .16 |
| | 238 | .10 .13 .16 |
| | 239 | .08 .12 .14 .16 .19 .22 |
| | 240 | .04 .10 .13 .16 .19 .22 |
| | 241 | .08 .10 |
| | 242 | .02 .05 |
| | 243 | 12 10 121 0 22.5 10.8 11.6 |
| | 244 | 2.63 |
| | 245 | 13 10 144 0 22.5 10.8 11.6 |
| | 246 | 2.63 |
| | 247 | 14 10 167 0 22.5 10.8 11.6 |
| | 248 | 2.63 |
| | 249 | 15 10 190 0 22.5 10.8 11.6 |
| | 250 | 2.63 |
| | 251 | 16 00 201 30 50.0 340 8.0 1.0 25 67 |
| | 252 | 5 |

Figure D-1. (Continued)

a. Card Group 1. Card Group 1 gives the user selected title for the program run. This title is printed at the top of each output page as shown in Figure D-2.

b. Card Group 2. Card Group 2 selects the program control options desired. This card group shows: ISW(1) equal to "1" for concentration, ISW(3) equal to "2" for discrete receptors in polar coordinates, ISW(5) equal to "1" for an output magnetic tape, ISW(6) equal to "3" for a full printout of the input data, ISW(7) equal to "2" for annual output only, ISW(8) equal to "3" for printing individual as well as combined sources results, ISW(9) equal to "3" for the Rural Mode, ISW(10) equal to "2" for a printout of concentration at all receptors as well as the maximum 10 values, and ISW(11) equal to "2" directing the program to determine the maximum 10 from the combined sources. The receptor grid system used is in Cartesian coordinates; hence, ISW(2) is left blank. Also, ISW(4) is left blank because flat terrain is assumed for the area in the vicinity of the hypothetical potash plant. The parameter ISW(12) is left blank because we are using ISW(11) for the maximum 10 values and the parameters ISW(13) through ISW(18) are left blank because we are using the program default values for these parameters. ISW(13) directs the print output to logical unit 6, ISW(14) is blank because we are not using an input tape and ISW(15) directs the tape output to the magnetic tape on logical unit 3. The default value for ISW(16) directs the program to use the standard print output format rather than compress pages, ISW(17) directs the program to use 57 lines per page, and ISW(18) tells the program that Card Group 9 is not read in this run. ISW(19) directs the program to calculate plume rise as a function of downwind distance because the building wake effects option is to be used for the stack. ISW(21), ISW(22), ISW(23) and ISW(24) were all set to "1" indicating buoyancy induced dispersion was not

- ISCLT INPUT DATA -

NUMBER OF SOURCES = 16
NUMBER OF X AXIS GRID SYSTEM POINTS = 19
NUMBER OF Y AXIS GRID SYSTEM POINTS = 19
NUMBER OF SPECIAL POINTS = 1
NUMBER OF SEASONS = 1
NUMBER OF WIND SPEED CLASSES = 6
NUMBER OF STABILITY CLASSES = 6
NUMBER OF WIND DIRECTION CLASSES = 16
FILE NUMBER OF DATA FILE USED FOR REPORTS = 1
THE PROGRAM IS RUN IN RURAL MODE
CONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR = .10000000+007
ACCELERATION OF GRAVITY (METERS/SEC**2) = 9.800
HEIGHT OF MEASUREMENT OF WIND SPEED (METERS) = 10.000
CORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTH (DEGREES) = .000
DECAY COEFFICIENT = .00000000
PROGRAM OPTION SWITCHES = 1, 1, 2, 0, 1, 3, 2, 3, 3, 2, 2, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1, 0,
SOURCES USED TO FORM SOURCE COMBINATION 1 ARE - 1,
SOURCES USED TO FORM SOURCE COMBINATION 2 ARE - 2, -11,
SOURCES USED TO FORM SOURCE COMBINATION 3 ARE - 12, -15,
SOURCES USED TO FORM SOURCE COMBINATION 4 ARE - 16,
SOURCES USED TO FORM SOURCE COMBINATION 5 ARE - -16,
DISTANCE X AXIS GRID SYSTEM POINTS (METERS )= -3000.00, -2000.00, -1500.00, -1250.00, -1000.00, -800.00,
-600.00, -400.00, -200.00, .00, 200.00, 400.00, 600.00, 800.00, 1000.00, 1250.00,
1500.00, 2000.00, 3000.00,
RANGE X SPECIAL DISCRETE POINTS (METERS )= 2100.00,
DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )= -3000.00, -2000.00, -1500.00, -1250.00, -1000.00, -800.00,
-600.00, -400.00, -200.00, .00, 200.00, 400.00, 600.00, 800.00, 1000.00, 1250.00,
1500.00, 2000.00, 3000.00,
AZIMUTH BEARING Y SPECIAL DISCRETE POINTS (DEGREES)= 14.00,

- AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

| | STABILITY CATEGORY 1 | STABILITY CATEGORY 2 | STABILITY CATEGORY 3 | STABILITY CATEGORY 4 | STABILITY CATEGORY 5 | STABILITY CATEGORY 6 |
|---|---|---|---|---|---|---|
| SEASON 1 | 287.2000 | 287.2000 | 283.2000 | 280.8000 | 279.1000 | 279.1000 |

- MIXING LAYER HEIGHT (METERS) -

SEASON 1

| | WIND SPEED CATEGORY 1 | WIND SPEED CATEGORY 2 | WIND SPEED CATEGORY 3 | WIND SPEED CATEGORY 4 | WIND SPEED CATEGORY 5 | WIND SPEED CATEGORY 6 |
|---|---|---|---|---|---|---|
| STABILITY CATEGORY 1 | .173000+004 | .173000+004 | .173000+004 | .173000+004 | .173000+004 | .173000+004 |
| STABILITY CATEGORY 2 | .173000+004 | .173000+004 | .173000+004 | .173000+004 | .173000+004 | .173000+004 |
| STABILITY CATEGORY 3 | .960000+003 | .102500+004 | .123500+004 | .129500+004 | .129500+004 | .129500+004 |
| STABILITY CATEGORY 4 | .320000+003 | .500000+003 | .840000+003 | .840000+003 | .840000+003 | .840000+003 |
| STABILITY CATEGORY 5 | .100000+005 | .100000+005 | .100000+005 | .100000+005 | .100000+005 | .100000+005 |
| STABILITY CATEGORY 6 | .100000+005 | .100000+005 | .100000+005 | .100000+005 | .100000+005 | .100000+005 |

Figure D-2. (Continued).



- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 1

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00016950 | .00008560 | .00000000 | .00000000 | .00000000 | .00000000 |
| 22.500 | .00012830 | .00019980 | .00000000 | .00000000 | .00000000 | .00000000 |
| 45.000 | .00009180 | .00019980 | .00000000 | .00000000 | .00000000 | .00000000 |
| 67.500 | .00010760 | .00025690 | .00000000 | .00000000 | .00000000 | .00000000 |
| 90.000 | .00031190 | .00059950 | .00000000 | .00000000 | .00000000 | .00000000 |
| 112.500 | .00036110 | .00051390 | .00000000 | .00000000 | .00000000 | .00000000 |
| 135.000 | .00038650 | .00034260 | .00000000 | .00000000 | .00000000 | .00000000 |
| 157.500 | .00069530 | .00079930 | .00000000 | .00000000 | .00000000 | .00000000 |
| 180.000 | .00067470 | .00085640 | .00000000 | .00000000 | .00000000 | .00000000 |
| 202.500 | .00055120 | .00054240 | .00000000 | .00000000 | .00000000 | .00000000 |
| 225.000 | .00014410 | .00025690 | .00000000 | .00000000 | .00000000 | .00000000 |
| 247.500 | .00011550 | .00028550 | .00000000 | .00000000 | .00000000 | .00000000 |
| 270.000 | .00028990 | .00025690 | .00000000 | .00000000 | .00000000 | .00000000 |
| 292.500 | .00008390 | .00017130 | .00000000 | .00000000 | .00000000 | .00000000 |
| 315.000 | .00006020 | .00008560 | .00000000 | .00000000 | .00000000 | .00000000 |
| 337.500 | .00028200 | .00022840 | .00000000 | .00000000 | .00000000 | .00000000 |

SEASON 1

STABILITY CATEGORY 2

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00073530 | .00077080 | .00057100 | .00000000 | .00000000 | .00000000 |
| 22.500 | .00104880 | .00108480 | .00048530 | .00000000 | .00000000 | .00000000 |
| 45.000 | .00044440 | .00068510 | .00019980 | .00000000 | .00000000 | .00000000 |
| 67.500 | .00096290 | .00148450 | .00085640 | .00000000 | .00000000 | .00000000 |
| 90.000 | .00187750 | .00279770 | .00168430 | .00000000 | .00000000 | .00000000 |
| 112.500 | .00168920 | .00279770 | .00276910 | .00000000 | .00000000 | .00000000 |
| 135.000 | .00197700 | .00316880 | .00342570 | .00000000 | .00000000 | .00000000 |
| 157.500 | .00262380 | .00399670 | .00425361 | .00000000 | .00000000 | .00000000 |
| 180.000 | .00459181 | .00422511 | .00285480 | .00000000 | .00000000 | .00000000 |
| 202.500 | .00262740 | .00308320 | .00105630 | .00000000 | .00000000 | .00000000 |
| 225.000 | .00145670 | .00108480 | .00062810 | .00000000 | .00000000 | .00000000 |
| 247.500 | .00165270 | .00211250 | .00071370 | .00000000 | .00000000 | .00000000 |
| 270.000 | .00249990 | .00211250 | .00111340 | .00000000 | .00000000 | .00000000 |
| 292.500 | .00134250 | .00119900 | .00077080 | .00000000 | .00000000 | .00000000 |
| 315.000 | .00091510 | .00068510 | .00045680 | .00000000 | .00000000 | .00000000 |
| 337.500 | .00073250 | .00074220 | .00037110 | .00000000 | .00000000 | .00000000 |

Figure D-2. (Continued).



- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 3

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00046450 | .00094210 | .00125610 | .00014270 | .00002850 | .00000000 |
| 22.500 | .00069900 | .00079930 | .00151300 | .00048530 | .00014270 | .00002850 |
| 45.000 | .00026680 | .00074220 | .00094210 | .00042820 | .00002850 | .00000000 |
| 67.500 | .00053170 | .00145590 | .00157010 | .00042820 | .00005710 | .00000000 |
| 90.000 | .00068820 | .00279770 | .00585231 | .00071370 | .00008560 | .00000000 |
| 112.500 | .00069610 | .00376830 | .00696571 | .00211250 | .00014270 | .00000000 |
| 135.000 | .00058420 | .00305460 | .00756521 | .00316880 | .00017130 | .00000000 |
| 157.500 | .00060830 | .00425361 | .00810761 | .00259780 | .00019980 | .00000000 |
| 180.000 | .00117710 | .00408231 | .00511011 | .00062810 | .00011420 | .00002850 |
| 202.500 | .00077160 | .00353990 | .00245510 | .00025690 | .00011420 | .00008560 |
| 225.000 | .00060500 | .00162720 | .00202690 | .00045680 | .00008560 | .00014270 |
| 247.500 | .00082450 | .00385390 | .00288330 | .00051390 | .00017130 | .00034260 |
| 270.000 | .00141350 | .00439641 | .00596651 | .00111340 | .00028550 | .00034260 |
| 292.500 | .00085360 | .00211250 | .00339720 | .00051390 | .00025690 | .00022840 |
| 315.000 | .00035030 | .00105630 | .00134170 | .00017130 | .00005710 | .00002850 |
| 337.500 | .00065610 | .00105630 | .00094210 | .00011420 | .00005710 | .00000000 |

SEASON 1

STABILITY CATEGORY 4

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00095500 | .00259780 | .00790771 | .01367442 | .01127641 | .01027721 |
| 22.500 | .00068970 | .00274060 | .00887841 | .01347452 | .00807901 | .00505301 |
| 45.000 | .00039840 | .00168430 | .00659451 | .00553831 | .00205540 | .00054240 |
| 67.500 | .00084830 | .00408231 | .00862141 | .00616631 | .00114190 | .00019980 |
| 90.000 | .00198280 | .00619491 | .01490192 | .01247542 | .00194120 | .00022840 |
| 112.500 | .00133650 | .00533841 | .01661482 | .01841332 | .00322590 | .00048530 |
| 135.000 | .00071740 | .00353990 | .00907821 | .01190441 | .00171290 | .00019980 |
| 157.500 | .00098470 | .00342570 | .00659451 | .00702281 | .00119900 | .00025690 |
| 180.000 | .00100970 | .00376830 | .00468181 | .00451051 | .00125610 | .00062810 |
| 202.500 | .00057970 | .00291190 | .00214110 | .00342570 | .00131320 | .00040530 |
| 225.000 | .00049800 | .00137030 | .00225530 | .00345430 | .00199530 | .00125610 |
| 247.500 | .00055930 | .00179850 | .00505301 | .00588081 | .00285480 | .00208400 |
| 270.000 | .00122310 | .00459621 | .00913531 | .01484482 | .00790771 | .00576671 |
| 292.500 | .00069900 | .00302690 | .00742241 | .01415972 | .01061981 | .00659451 |
| 315.000 | .00053550 | .00188420 | .00511011 | .00759371 | .00294040 | .00194120 |
| 337.500 | .00074000 | .00216960 | .00653741 | .00559541 | .00262640 | .00159870 |

Figure D-2. (Continued).



- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 5

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00000000 | .00525281 | .00950641 | .00000000 | .00000000 | .00000000 |
| 22.500 | .00000000 | .00325440 | .00767941 | .00000000 | .00000000 | .00000000 |
| 45.000 | .00000000 | .00177000 | .00570961 | .00000000 | .00000000 | .00000000 |
| 67.500 | .00000000 | .00336860 | .00759371 | .00000000 | .00000000 | .00000000 |
| 90.000 | .00000000 | .00496731 | .00970621 | .00000000 | .00000000 | .00000000 |
| 112.500 | .00000000 | .00274060 | .00562391 | .00000000 | .00000000 | .00000000 |
| 135.000 | .00000000 | .00177000 | .00274060 | .00000000 | .00000000 | .00000000 |
| 157.500 | .00000000 | .00236950 | .00182710 | .00000000 | .00000000 | .00000000 |
| 180.000 | .00000000 | .00245510 | .00157010 | .00000000 | .00000000 | .00000000 |
| 202.500 | .00000000 | .00182710 | .00131320 | .00000000 | .00000000 | .00000000 |
| 225.000 | .00000000 | .00165580 | .00199830 | .00000000 | .00000000 | .00000000 |
| 247.500 | .00000000 | .00342570 | .00553831 | .00000000 | .00000000 | .00000000 |
| 270.000 | .00000000 | .00668021 | .01116221 | .00000000 | .00000000 | .00000000 |
| 292.500 | .00000000 | .00499591 | .00702281 | .00000000 | .00000000 | .00000000 |
| 315.000 | .00000000 | .00356850 | .00630911 | .00000000 | .00000000 | .00000000 |
| 337.500 | .00000000 | .00522421 | .00899251 | .00000000 | .00000000 | .00000000 |

SEASON 1

STABILITY CATEGORY 6

| DIRECTION (DEGREES) | WIND SPEED CATEGORY 1 ( 1.5000MPS) | WIND SPEED CATEGORY 2 ( 2.5000MPS) | WIND SPEED CATEGORY 3 ( 4.3000MPS) | WIND SPEED CATEGORY 4 ( 6.8000MPS) | WIND SPEED CATEGORY 5 ( 9.5000MPS) | WIND SPEED CATEGORY 6 (12.5000MPS) |
|---|---|---|---|---|---|---|
| .000 | .00684121 | .00973481 | .00000000 | .00000000 | .00000000 | .00000000 |
| 22.500 | .00373070 | .00559541 | .00000000 | .00000000 | .00000000 | .00000000 |
| 45.000 | .00247790 | .00431071 | .00000000 | .00000000 | .00000000 | .00000000 |
| 67.500 | .00283840 | .00493881 | .00000000 | .00000000 | .00000000 | .00000000 |
| 90.000 | .00475321 | .00773641 | .00000000 | .00000000 | .00000000 | .00000000 |
| 112.500 | .00306470 | .00491021 | .00000000 | .00000000 | .00000000 | .00000000 |
| 135.000 | .00320440 | .00282620 | .00000000 | .00000000 | .00000000 | .00000000 |
| 157.500 | .00356230 | .00236950 | .00000000 | .00000000 | .00000000 | .00000000 |
| 180.000 | .00470731 | .00316880 | .00000000 | .00000000 | .00000000 | .00000000 |
| 202.500 | .00486151 | .00416801 | .00000000 | .00000000 | .00000000 | .00000000 |
| 225.000 | .00296740 | .00342570 | .00000000 | .00000000 | .00000000 | .00000000 |
| 247.500 | .00590741 | .00944931 | .00000000 | .00000000 | .00000000 | .00000000 |
| 270.000 | .01170781 | .02055443 | .00000000 | .00000000 | .00000000 | .00000000 |
| 292.500 | .00742881 | .01204721 | .00000000 | .00000000 | .00000000 | .00000000 |
| 315.000 | .00629421 | .00982041 | .00000000 | .00000000 | .00000000 | .00000000 |
| 337.500 | .00761371 | .01281802 | .00000000 | .00000000 | .00000000 | .00000000 |

Figure D-2. (Continued).



- ISCLT INPUT DATA (CONT.) -

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

| | WIND SPEED CATEGORY 1 | WIND SPEED CATEGORY 2 | WIND SPEED CATEGORY 3 | WIND SPEED CATEGORY 4 | WIND SPEED CATEGORY 5 | WIND SPEED CATEGORY 6 |
|---|---|---|---|---|---|---|
| STABILITY CATEGORY 1 | .000000 | .000000 | .000000 | .000000 | .000000 | .000000 |
| STABILITY CATEGORY 2 | .000000 | .000000 | .000000 | .000000 | .000000 | .000000 |
| STABILITY CATEGORY 3 | .000000 | .000000 | .000000 | .000000 | .000000 | .000000 |
| STABILITY CATEGORY 4 | .000000 | .000000 | .000000 | .000000 | .000000 | .000000 |
| STABILITY CATEGORY 5 | .200000-001 | .200000-001 | .200000-001 | .200000-001 | .200000-001 | .200000-001 |
| STABILITY CATEGORY 6 | .350000-001 | .350000-001 | .350000-001 | .350000-001 | .350000-001 | .350000-001 |

- WIND PROFILE POWER LAW EXPONENTS -

| | WIND SPEED CATEGORY 1 | WIND SPEED CATEGORY 2 | WIND SPEED CATEGORY 3 | WIND SPEED CATEGORY 4 | WIND SPEED CATEGORY 5 | WIND SPEED CATEGORY 6 |
|---|---|---|---|---|---|---|
| STABILITY CATEGORY 1 | .700000-001 | .700000-001 | .700000-001 | .700000-001 | .700000-001 | .700000-001 |
| STABILITY CATEGORY 2 | .700000-001 | .700000-001 | .700000-001 | .700000-001 | .700000-001 | .700000-001 |
| STABILITY CATEGORY 3 | .100000+000 | .100000+000 | .100000+000 | .100000+000 | .100000+000 | .100000+000 |
| STABILITY CATEGORY 4 | .150000+000 | .150000+000 | .150000+000 | .150000+000 | .150000+000 | .150000+000 |
| STABILITY CATEGORY 5 | .350000+000 | .350000+000 | .350000+000 | .350000+000 | .350000+000 | .350000+000 |
| STABILITY CATEGORY 6 | .550000+000 | .550000+000 | .550000+000 | .550000+000 | .550000+000 | .550000+000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV- ATION (M) | - SOURCE DETAILS DEPENDING ON TYPE - |
|---|---|---|---|---|---|---|---|---|
| X | | 1 | AREA | -13.30 | -13.30 | 10.00 | .00 | WIDTH OF AREA (M)= 26.60 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC PER SQUARE METER ) -

- SEASON 1 -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 4.00000-001 | 3.00000-001 | 2.00000-001 | 1.00000-001 | .00000 | 5.00000-002 |
| 2 | 5.00000-001 | 4.00000-001 | 3.00000-001 | 2.50000-001 | 2.00000-001 | 1.00000-001 |
| 3 | .00000 | 5.00000-001 | 4.00000-001 | 5.00000-001 | 2.50000-001 | .00000 |
| 4 | .00000 | .00000 | 5.00000-001 | 5.00000-001 | .00000 | .00000. |
| 5 | .00000 | .00000 | 7.00000-001 | 7.00000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 1.00000+000 | 1.00000+000 | .00000 | .00000 |

WARNING - DISTANCE BETWEEN SOURCE 1 AND POINT X,Y= .00, .00 IS LESS THAN PERMITTED

| | | | | | |
|---|---|---|---|---|---|
| X | 2 | VOLUME | 20.00 | .00 | .90 |

.00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70

STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV- ATION (M) |
|---|---|---|---|---|---|---|---|
| X | | 3 | VOLUME | 30.00 | .00 | 2.60 | .00 |

- SOURCE DETAILS DEPENDING ON TYPE -

STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV- ATION (M) |
|---|---|---|---|---|---|---|---|
| X | | 4 | VOLUME | 40.00 | .00 | 4.30 | .00 |

STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV-ATION (M) |
|---|---|---|---|---|---|---|---|
| X | | 5 | VOLUME | 49.00 | .00 | 6.10 | .00 |

- SOURCE DETAILS DEPENDING ON TYPE -

STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

- STABILITY CATEGORIES -

| SPEED CATEGORY | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV-ATION (M) |
|---|---|---|---|---|---|---|---|
| X | | 6 | VOLUME | 59.00 | .00 | 7.80 | .00 |

STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70
STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

- STABILITY CATEGORIES -

| SPEED CATEGORY | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEVATION (M) | - SOURCE DETAILS DEPENDING ON TYPE - |
|---|---|---|---|---|---|---|---|---|
| X | | 7 | VOLUME | 69.00 | .00 | 9.60 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC - SEASON 1 - ) -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| X | | 8 | VOLUME | 79.00 | .00 | 11.30 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC - SEASON 1 - ) -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| C A R D | T A P E | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV- ATION (M) | - SOURCE DETAILS DEPENDING ON TYPE - |
|---|---|---|---|---|---|---|---|---|
| X | | 9 | VOLUME | 89.00 | .00 | 13.00 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70 |
| | | | | | | | | STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC - SEASON 1 - ) -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X | | 10 | VOLUME | 99.00 | .00 | 14.80 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70 |
| | | | | | | | | STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC - SEASON 1 - ) -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

Figure D-2. (Continued).



- SOURCE INPUT DATA -

| CARD | TAPE | SOURCE NUMBER | SOURCE TYPE | X COORDINATE (M) | Y COORDINATE (M) | EMISSION HEIGHT (M) | BASE ELEV- ATION (M) | - SOURCE DETAILS DEPENDING ON TYPE - |
|---|---|---|---|---|---|---|---|---|
| X | | 11 | VOLUME | 109.00 | .00 | 16.50 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 4.70<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 1.00 |

- PARTICULATE CATEGORIES -

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| FALL VELOCITY (MPS) | .0010 | .0070 | .0190 | .0370 | .0610 | .0990 |
| MASS FRACTION | .1000 | .4000 | .2800 | .1200 | .0600 | .0400 |
| REFLECTION COEFFICIENT | 1.0000 | .8200 | .7200 | .6500 | .5900 | .5000 |

- SOURCE STRENGTHS ( GRAMS PER SEC ) -

- SEASON 1 -

| SPEED CATEGORY | - STABILITY CATEGORIES - (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| 1 | 1.30000-001 | 1.00000-001 | 8.00000-002 | 4.00000-002 | .00000 | 2.00000-002 |
| 2 | 1.60000-001 | 1.30000-001 | 1.20000-001 | 1.00000-001 | 8.00000-002 | 5.00000-002 |
| 3 | .00000 | 1.60000-001 | 1.40000-001 | 1.30000-001 | 1.00000-001 | .00000 |
| 4 | .00000 | .00000 | 1.60000-001 | 1.60000-001 | .00000 | .00000 |
| 5 | .00000 | .00000 | 1.90000-001 | 1.90000-001 | .00000 | .00000 |
| 6 | .00000 | .00000 | 2.20000-001 | 2.20000-001 | .00000 | .00000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | 12 | VOLUME | 121.00 | .00 | 22.50 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 10.80<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 11.60<br>- SOURCE STRENGTHS ( GRAMS PER SEC ) -<br>SEASON 1 SEASON 2 SEASON 3 SEASON 4<br>2.63000+000 |
| X | 13 | VOLUME | 144.00 | .00 | 22.50 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 10.80<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 11.60<br>- SOURCE STRENGTHS ( GRAMS PER SEC ) -<br>SEASON 1 SEASON 2 SEASON 3 SEASON 4<br>2.63000+000 |
| X | 14 | VOLUME | 167.00 | .00 | 22.50 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 10.80<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 11.60<br>- SOURCE STRENGTHS ( GRAMS PER SEC ) -<br>SEASON 1 SEASON 2 SEASON 3 SEASON 4<br>2.63000+000 |
| X | 15 | VOLUME | 190.00 | .00 | 22.50 | .00 | STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)= 10.80<br>STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)= 11.60<br>- SOURCE STRENGTHS ( GRAMS PER SEC ) -<br>SEASON 1 SEASON 2 SEASON 3 SEASON 4<br>2.63000+000 |
| WARNING - DISTANCE BETWEEN SOURCE 15 AND POINT X,Y= 200.00, .00 IS LESS THAN PERMITTED | | | | | | | |
| X | 16 | STACK | 201.00 | 30.00 | 50.00 | .00 | GAS EXIT TEMP (DEG K)= 340.00, GAS EXIT VEL. (M/SEC)= 8.00,<br>STACK DIAMETER (M)= 1.000, HEIGHT OF ASSO. BLDG. (M)= 25.00, WIDTH OF<br>ASSO. BLDG. (M)= 67.00, WAKE EFFECTS FLAG = 0<br>- SOURCE STRENGTHS ( GRAMS PER SEC ) -<br>SEASON 1 SEASON 2 SEASON 3 SEASON 4<br>5.00000+000 |
| WARNING - DISTANCE BETWEEN SOURCE 16 AND POINT X,Y= 200.00, .00 IS LESS THAN PERMITTED | | | | | | | |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 1 **

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - X AXIS (DISTANCE, METERS) - CONCENTRATION - | | | | | | | | |
| 3000.000 | 14.694939 | 17.740330 | 19.059936 | 19.739814 | 20.038158 | 20.465120 | 20.717094 | 20.771536 | 20.603538 |
| 2000.000 | 24.302441 | 29.608470 | 33.920876 | 36.464540 | 38.507621 | 39.502174 | 41.067560 | 42.036382 | 42.088817 |
| 1500.000 | 30.762213 | 42.678197 | 49.010515 | 52.611596 | 58.583042 | 62.666197 | 65.989618 | 68.551908 | 69.821260 |
| 1250.000 | 34.886642 | 51.239852 | 61.515057 | 67.539449 | 73.669224 | 81.491526 | 87.788735 | 92.463557 | 95.893963 |
| 1000.000 | 36.612810 | 60.818020 | 78.605643 | 88.323235 | 100.093095 | 107.929635 | 122.231598 | 136.200083 | 140.463684 |
| 800.000 | 37.995659 | 69.478446 | 94.423663 | 111.070321 | 129.053152 | 148.213663 | 163.112898 | 189.263662 | 206.542271 |
| 600.000 | 39.116838 | 73.918410 | 113.613680 | 137.162146 | 170.321285 | 201.519106 | 248.836727 | 286.228844 | 331.787094 |
| 400.000 | 39.927816 | 77.430562 | 122.082540 | 160.872060 | 226.415386 | 281.609787 | 372.539582 | 518.138878 | 622.779861 |
| 200.000 | 40.370279 | 79.510048 | 128.140215 | 172.451950 | 245.976141 | 353.472965 | 550.332375 | 882.257034 | 1613.878723 |
| .000 | 40.979896 | 81.543497 | 133.067314 | 181.099644 | 263.298332 | 388.629272 | 635.748596 | 1217.754547 | 2954.066681 |
| -200.000 | 37.459093 | 71.090247 | 110.522025 | 144.552137 | 197.574209 | 269.205189 | 383.435799 | 520.787308 | 1037.923401 |
| -400.000 | 34.633294 | 62.453043 | 91.546115 | 113.612117 | 145.644056 | 172.242220 | 229.666870 | 352.263115 | 658.313255 |
| -600.000 | 31.627005 | 53.339277 | 72.689496 | 84.629873 | 106.401945 | 127.545597 | 171.558754 | 274.716499 | 464.680809 |
| -800.000 | 28.523260 | 44.301801 | 58.956098 | 70.323149 | 83.278643 | 103.011294 | 147.471733 | 220.209049 | 312.341709 |
| -1000.000 | 25.391930 | 37.937536 | 50.253506 | 57.552294 | 70.039513 | 94.192499 | 131.262175 | 187.594975 | 223.842525 |
| -1250.000 | 21.765865 | 32.752200 | 40.629251 | 47.535768 | 65.105455 | 85.567405 | 110.083417 | 139.812283 | 161.129984 |
| -1500.000 | 19.315297 | 28.008097 | 34.664792 | 45.215777 | 60.561036 | 75.301590 | 95.319164 | 109.308763 | 121.976810 |
| -2000.000 | 15.833028 | 21.135674 | 32.512882 | 40.348825 | 49.406232 | 58.718858 | 65.627118 | 72.084106 | 77.578905 |
| -3000.000 | 10.623216 | 19.209295 | 25.329159 | 29.415417 | 32.301473 | 34.640580 | 36.833163 | 38.819043 | 40.524932 |

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - X AXIS (DISTANCE, METERS) - CONCENTRATION - | | | | | | | | |
| 3000.000 | 20.561385 | 19.250212 | 18.314191 | 17.246256 | 16.082750 | 14.854356 | 13.454515 | 12.208061 | 10.331922 |
| 2000.000 | 42.181269 | 38.117813 | 34.988705 | 31.403325 | 27.648318 | 24.590035 | 21.686514 | 18.937526 | 14.971287 |
| 1500.000 | 70.489342 | 61.410886 | 54.019938 | 46.191466 | 39.150154 | 34.056457 | 28.238364 | 24.858001 | 24.231983 |
| 1250.000 | 97.570199 | 82.454284 | 69.785025 | 56.485029 | 48.009252 | 40.177439 | 34.371873 | 33.637501 | 30.631876 |
| 1000.000 | 145.075630 | 116.853097 | 95.211921 | 73.368764 | 58.870375 | 51.196520 | 49.112293 | 46.231785 | 38.110562 |
| 800.000 | 218.223764 | 164.957937 | 119.099558 | 90.876937 | 76.180847 | 71.799335 | 66.079905 | 59.495349 | 48.136865 |
| 600.000 | 367.055534 | 248.075336 | 164.264231 | 128.449055 | 114.408483 | 102.845301 | 86.692365 | 79.523463 | 62.061473 |
| 400.000 | 739.120125 | 378.098328 | 268.016754 | 216.096468 | 175.459341 | 160.757558 | 131.895990 | 108.979997 | 76.461813 |
| 200.000 | 2026.026093 | 821.064690 | 506.550797 | 443.259235 | 323.394745 | 242.842098 | 180.416180 | 139.292295 | 90.609410 |
| .000 | .000000 | 3254.023773 | 1471.954681 | 796.166214 | 495.569996 | 339.537441 | 235.025063 | 173.307035 | 106.566267 |
| -200.000 | 2567.034790 | 1310.713470 | 819.536018 | 582.062675 | 396.051682 | 285.591663 | 205.671888 | 155.523102 | 98.548850 |
| -400.000 | 1158.649185 | 630.950935 | 471.329025 | 353.892437 | 276.767231 | 233.460459 | 174.975306 | 137.264694 | 90.641037 |
| -600.000 | 622.747154 | 430.117668 | 295.183231 | 234.068138 | 193.868336 | 167.731993 | 137.502249 | 117.769375 | 81.621239 |
| -800.000 | 386.130802 | 296.093839 | 215.436956 | 168.535784 | 141.785255 | 125.051361 | 109.922016 | 94.690763 | 72.173792 |
| -1000.000 | 263.989559 | 214.879730 | 174.356894 | 136.553247 | 111.420404 | 96.690296 | 86.338271 | 78.033554 | 61.539259 |
| -1250.000 | 183.219280 | 155.865009 | 130.891008 | 105.972672 | 91.096764 | 77.034763 | 65.718378 | 60.309857 | 51.423201 |
| -1500.000 | 135.501400 | 118.559653 | 103.336452 | 87.689623 | 74.677591 | 65.439378 | 54.717616 | 47.958244 | 42.502358 |
| -2000.000 | 83.780705 | 75.847097 | 69.013844 | 61.419669 | 53.612286 | 47.712314 | 42.283691 | 37.092239 | 29.271084 |
| -3000.000 | 42.601424 | 39.839943 | 37.671403 | 35.215941 | 32.598690 | 29.881367 | 26.791735 | 24.304282 | 20.608344 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 1 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METEPS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | 7.401333 |
| 2000.000 | 14.275576 |
| 1500.000 | 19.257679 |
| 1250.000 | 22.905709 |
| 1000.000 | 28.727403 |
| 800.000 | 33.639297 |
| 600.000 | 38.617332 |
| 400.000 | 43.557491 |
| 200.000 | 48.334592 |
| .000 | 53.794253 |
| -200.000 | 51.171764 |
| -400.000 | 48.732267 |
| -600.000 | 45.957129 |
| -800.000 | 42.944610 |
| -1000.000 | 39.774530 |
| -1250.000 | 35.972745 |
| -1500.000 | 31.402745 |
| -2000.000 | 24.585611 |
| -3000.000 | 14.708533 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | 31.991203 | | | | | | |

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 1,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| 200.00 | .00 | 3254.023773 |
| -200.00 | .00 | 2954.066681 |
| .00 | -200.00 | 2567.034790 |
| .00 | 200.00 | 2026.026093 |
| -200.00 | 200.00 | 1613.878723 |
| 400.00 | .00 | 1471.954681 |
| 200.00 | -200.00 | 1310.713470 |
| -400.00 | .00 | 1217.754547 |
| .00 | -400.00 | 1158.649185 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 1 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 1,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| -200.00 | -200.00 | 1037.923401 |

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 2 **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - CONCENTRATION - | | | | | | | | |
| 3000.000 | .006730 | .008287 | .008983 | .009236 | .009545 | .009789 | .009952 | .010022 | .009989 |
| 2000.000 | .011159 | .013540 | .015841 | .017132 | .018225 | .019126 | .019700 | .020300 | .020469 |
| 1500.000 | .014086 | .019696 | .022381 | .024558 | .027572 | .029734 | .032241 | .033154 | .034101 |
| 1250.000 | .016004 | .023593 | .028543 | .030820 | .034551 | .038565 | .042005 | .044792 | .047036 |
| 1000.000 | .016862 | .027942 | .036365 | .041114 | .045676 | .050903 | .058405 | .066454 | .069388 |
| 800.000 | .017600 | .031888 | .043588 | .051573 | .060465 | .067723 | .077737 | .091801 | .102619 |
| 600.000 | .018226 | .034228 | .052058 | .063537 | .079605 | .095262 | .113624 | .139222 | .166535 |
| 400.000 | .018715 | .036141 | .056896 | .075008 | .103902 | .132076 | .178210 | .240611 | .325497 |
| 200.000 | .019042 | .037418 | .060319 | .081332 | .116533 | .167675 | .264930 | .454026 | .846305 |
| .000 | .019439 | .038650 | .063157 | .086190 | .125947 | .186468 | .310734 | .634153 | 2.025068 |
| -200.000 | .017832 | .034029 | .053160 | .069904 | .096466 | .132400 | .193262 | .291274 | .571056 |
| -400.000 | .016556 | .029969 | .044185 | .055183 | .070553 | .085232 | .115604 | .164732 | .337402 |
| -600.000 | .015145 | .025676 | .035059 | .041273 | .052141 | .062934 | .078634 | .130459 | .228576 |
| -800.000 | .013687 | .021410 | .028571 | .034130 | .040539 | .047335 | .068876 | .103216 | .149225 |
| -1000.000 | .012215 | .018332 | .024259 | .027797 | .032181 | .043764 | .061018 | .087536 | .106018 |
| -1250.000 | .010559 | .015769 | .019519 | .021881 | .030135 | .039518 | .050820 | .064948 | .075518 |
| -1500.000 | .009310 | .013438 | .016001 | .020918 | .027892 | .034614 | .044455 | .050584 | .056800 |
| -2000.000 | .007592 | .009801 | .014992 | .018525 | .022613 | .027147 | .030124 | .033216 | .035882 |
| -3000.000 | .004953 | .008822 | .011562 | .013169 | .014744 | .015843 | .016881 | .017828 | .018652 |

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - CONCENTRATION - | | | | | | | | |
| 3000.000 | .009896 | .009483 | .009064 | .008575 | .008037 | .007463 | .006785 | .006154 | .005157 |
| 2000.000 | .020291 | .018933 | .017544 | .015858 | .014036 | .012499 | .010945 | .009490 | .007228 |
| 1500.000 | .033946 | .030956 | .027470 | .023485 | .020054 | .017313 | .014215 | .012020 | .012022 |
| 1250.000 | .047095 | .042018 | .035921 | .029280 | .024661 | .020437 | .016655 | .016699 | .015319 |
| 1000.000 | .070351 | .060605 | .048870 | .038343 | .030365 | .024928 | .024611 | .023256 | .019199 |
| 800.000 | .106446 | .087339 | .063774 | .047842 | .037400 | .030394 | .033586 | .029710 | .024371 |
| 600.000 | .182287 | .136710 | .090265 | .064006 | .059206 | .053234 | .044635 | .040713 | .031392 |
| 400.000 | .389859 | .244207 | .140069 | .117195 | .093645 | .084673 | .068332 | .055930 | .038757 |
| 200.000 | 1.371331 | .541728 | .330957 | .251855 | .176255 | .128960 | .094171 | .071792 | .046014 |
| .000 | 88.687690 | 3.572526 | .905294 | .462595 | .272363 | .180883 | .122769 | .089306 | .054064 |
| -200.000 | 1.988977 | .954055 | .504038 | .324068 | .211560 | .149007 | .105770 | .079122 | .049526 |
| -400.000 | .615843 | .437242 | .259200 | .189848 | .143494 | .119928 | .088109 | .068728 | .045054 |
| -600.000 | .302196 | .241580 | .166713 | .121216 | .099646 | .084846 | .068322 | .058360 | .040086 |
| -800.000 | .181917 | .156406 | .117381 | .090758 | .071940 | .063182 | .054689 | .046548 | .035202 |
| -1000.000 | .123067 | .109972 | .090794 | .072570 | .058702 | .048492 | .043059 | .038472 | .029850 |
| -1250.000 | .084647 | .077644 | .067226 | .055574 | .047518 | .039943 | .032720 | .029887 | .025057 |
| -1500.000 | .062286 | .058067 | .051942 | .044931 | .038695 | .033762 | .028071 | .023796 | .020823 |
| -2000.000 | .038348 | .036431 | .033790 | .030701 | .027359 | .024486 | .021616 | .018888 | .014481 |
| -3000.000 | .019466 | .018829 | .018006 | .017057 | .016015 | .014907 | .013632 | .012361 | .010424 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 2 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | .003569 |
| 2000.000 | .007069 |
| 1500.000 | .009616 |
| 1250.000 | .011349 |
| 1000.000 | .014373 |
| 800.000 | .016843 |
| 600.000 | .019349 |
| 400.000 | .021841 |
| 200.000 | .024248 |
| .000 | .026969 |
| -200.000 | .025480 |
| -400.000 | .024099 |
| -600.000 | .022558 |
| -800.000 | .020914 |
| -1000.000 | .019206 |
| -1250.000 | .017073 |
| -1500.000 | .015060 |
| -2000.000 | .011893 |
| -3000.000 | .007260 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | .016086 | | | | | | |

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2, -11,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| .00 | .00 | 88.687690 |
| 200.00 | .00 | 3.572526 |
| -200.00 | .00 | 2.025068 |
| .00 | -200.00 | 1.988977 |
| .00 | 200.00 | 1.371331 |
| 400.00 | .00 | .985294 |
| 200.00 | -200.00 | .954055 |
| -200.00 | 200.00 | .846305 |
| -400.00 | .00 | .634153 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 2 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2, -11,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| .00 | -400.00 | .615843 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) FROM COMBINED SOURCES 2, -11,

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION - | | | | | | | | |
| 3000.000 | .066996 | .082302 | .089468 | .091964 | .095036 | .097678 | .099548 | .100516 | .100472 |
| 2000.000 | .110422 | .133830 | .155720 | .168740 | .180063 | .187880 | .194744 | .201627 | .204402 |
| 1500.000 | .138662 | .193662 | .219558 | .238872 | .268724 | .290774 | .309875 | .325304 | .337388 |
| 1250.000 | .155726 | .230660 | .279313 | .300293 | .333371 | .372975 | .408348 | .436466 | .461221 |
| 1000.000 | .165035 | .271644 | .352334 | .398465 | .440305 | .484755 | .557971 | .623482 | .670176 |
| 800.000 | .172153 | .307500 | .419001 | .494259 | .578877 | .643423 | .728308 | .863472 | .970124 |
| 600.000 | .178195 | .329555 | .493893 | .602513 | .749190 | .892299 | 1.048724 | 1.260705 | 1.575295 |
| 400.000 | .182913 | .347367 | .538138 | .701149 | .952784 | 1.205805 | 1.594364 | 2.092759 | 2.756820 |
| 200.000 | .186101 | .359272 | .568823 | .756182 | 1.061057 | 1.482022 | 2.250297 | 3.813609 | 6.158075 |
| .000 | .190023 | .371001 | .594840 | .799366 | 1.140937 | 1.632269 | 2.583886 | 4.772127 | 11.960189 |
| -200.000 | .175039 | .327610 | .503266 | .653179 | .884266 | 1.180588 | 1.664641 | 2.475178 | 3.777470 |
| -400.000 | .162303 | .289603 | .421361 | .521513 | .655235 | .775440 | 1.022805 | 1.351135 | 2.535072 |
| -600.000 | .148759 | .249354 | .336838 | .391097 | .488908 | .585195 | .696850 | 1.090471 | 1.902211 |
| -800.000 | .134735 | .208930 | .274612 | .326450 | .386144 | .436266 | .608539 | .909271 | 1.339877 |
| -1000.000 | .120555 | .176504 | .234836 | .268591 | .302841 | .397535 | .554191 | .760380 | .982285 |
| -1250.000 | .103752 | .154339 | .190664 | .209211 | .279984 | .367164 | .472771 | .612299 | .715085 |
| -1500.000 | .091914 | .132189 | .154622 | .197280 | .262986 | .326594 | .404542 | .483097 | .546184 |
| -2000.000 | .075314 | .095868 | .143958 | .177899 | .217283 | .255461 | .291887 | .323153 | .350616 |
| -3000.000 | .049045 | .086223 | .113009 | .128224 | .144859 | .155967 | .166558 | .176277 | .184839 |

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION -, | | | | | | | | |
| 3000.000 | .099395 | .096182 | .092208 | .087502 | .082254 | .076602 | .069333 | .063096 | .052968 |
| 2000.000 | .202590 | .192563 | .179016 | .162798 | .144930 | .128293 | .112633 | .097821 | .073052 |
| 1500.000 | .336537 | .313978 | .281425 | .242599 | .206121 | .178597 | .147060 | .121195 | .121109 |
| 1250.000 | .463789 | .425952 | .369234 | .306430 | .254314 | .211646 | .167635 | .166410 | .155225 |
| 1000.000 | .684976 | .613427 | .502984 | .394243 | .314668 | .249920 | .244422 | .234200 | .195557 |
| 800.000 | 1.020374 | .883270 | .674599 | .495000 | .372634 | .357824 | .337206 | .301364 | .246916 |
| 600.000 | 1.694922 | 1.379131 | .919989 | .630846 | .577869 | .531359 | .452348 | .407216 | .320555 |
| 400.000 | 3.379304 | 2.453755 | 1.331585 | 1.119356 | .932453 | .818713 | .691666 | .571243 | .398253 |
| 200.000 | 9.828193 | 4.536105 | 2.940626 | 2.442560 | 1.764919 | 1.314065 | .966140 | .739486 | .474780 |
| .000 | 151.781187 | 23.636500 | 9.060389 | 4.619604 | 2.790868 | 1.870465 | 1.271050 | .925674 | .559778 |
| -200.000 | 11.318276 | 6.828987 | 4.451818 | 3.228387 | 2.138862 | 1.526862 | 1.088396 | .816511 | .511463 |
| -400.000 | 4.687866 | 3.968169 | 2.363297 | 1.622004 | 1.433528 | 1.183601 | .899585 | .705437 | .463903 |
| -600.000 | 2.572001 | 2.319116 | 1.630996 | 1.178826 | .982389 | .851100 | .693809 | .592635 | .411006 |
| -800.000 | 1.632346 | 1.533023 | 1.215313 | .919102 | .714301 | .628391 | .552084 | .473330 | .360814 |
| -1000.000 | 1.136942 | 1.008379 | .912852 | .733760 | .606678 | .536736 | .432174 | .389568 | .304337 |
| -1250.000 | .799464 | .775192 | .680059 | .576310 | .485256 | .410615 | .330809 | .301051 | .254781 |
| -1500.000 | .596412 | .582264 | .526372 | .459209 | .394686 | .346218 | .289236 | .241126 | .211147 |
| -2000.000 | .373069 | .366837 | .342393 | .313199 | .280941 | .250326 | .221818 | .194360 | .167249 |
| -3000.000 | .192147 | .190157 | .182403 | .173464 | .163439 | .152655 | .138365 | .126664 | .107125 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) (CONT.) FROM COMBINED SOURCES 2, -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | .036146 |
| 2000.000 | .071751 |
| 1500.000 | .098095 |
| 1250.000 | .114272 |
| 1000.000 | .146666 |
| 800.000 | .172449 |
| 600.000 | .190655 |
| 400.000 | .224678 |
| 200.000 | .249824 |
| .000 | .278227 |
| -200.000 | .262574 |
| -400.000 | .248029 |
| -600.000 | .231792 |
| -800.000 | .214433 |
| -1000.000 | .196466 |
| -1250.000 | .172508 |
| -1500.000 | .153591 |
| -2000.000 | .121069 |
| -3000.000 | .074004 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | .164647 | | | | | | |

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| .00 | .00 | 151.781187 |
| 200.00 | .00 | 23.636500 |
| -200.00 | .00 | 11.960189 |
| .00 | -200.00 | 11.318276 |
| .00 | 200.00 | 9.828193 |
| 400.00 | .00 | 9.060359 |
| 200.00 | -200.00 | 6.828987 |
| -200.00 | 200.00 | 6.158075 |
| -400.00 | .00 | 4.772127 |

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 47 ****

** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) (CONT.) FROM COMBINED SOURCES 2, -11,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| .00 | -400.00 | 4.687866 |

Figure D-2. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 60 ****

** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) FROM COMBINED SOURCES 12, -15,

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION - | | | | | | | | |
| 3000.000 | .761770 | .913400 | 1.004414 | 1.043227 | 1.097318 | 1.134168 | 1.173254 | 1.205097 | 1.228379 |
| 2000.000 | 1.141867 | 1.372372 | 1.529028 | 1.658487 | 1.778443 | 1.870379 | 1.991252 | 2.068716 | 2.147994 |
| 1500.000 | 1.375643 | 1.830413 | 2.064339 | 2.177970 | 2.394345 | 2.597194 | 2.786233 | 3.024596 | 3.150433 |
| 1250.000 | 1.555287 | 2.102560 | 2.482244 | 2.666630 | 2.846071 | 3.102237 | 3.411735 | 3.870709 | 3.980807 |
| 1000.000 | 1.654695 | 2.402559 | 2.966479 | 3.292783 | 3.614225 | 3.969446 | 4.247049 | 4.768987 | 5.390952 |
| 800.000 | 1.740491 | 2.726411 | 3.397590 | 3.865848 | 4.404581 | 4.856180 | 5.460820 | 5.952523 | 7.247478 |
| 600.000 | 1.818775 | 2.919727 | 3.986387 | 4.859529 | 5.316925 | 6.099183 | 6.969049 | 8.140697 | 9.136564 |
| 400.000 | 1.887473 | 3.098363 | 4.304455 | 5.221580 | 6.571609 | 8.422382 | 9.216727 | 10.958037 | 13.881349 |
| 200.000 | 1.944687 | 3.240901 | 4.571430 | 5.618594 | 7.151659 | 8.947813 | 11.662705 | 16.670878 | 22.077493 |
| .000 | 2.055802 | 3.490970 | 5.002758 | 6.215974 | 8.031231 | 10.214259 | 13.585494 | 19.270468 | 30.924355 |
| -200.000 | 1.860339 | 3.023258 | 4.157481 | 5.008488 | 6.193239 | 7.484593 | 9.251507 | 12.169548 | 13.588237 |
| -400.000 | 1.738141 | 2.719346 | 3.596813 | 4.192921 | 4.995240 | 5.992803 | 6.086271 | 6.915211 | 9.795648 |
| -600.000 | 1.609048 | 2.399424 | 3.039190 | 3.501342 | 3.652524 | 4.117614 | 4.604605 | 5.998398 | 8.047790 |
| -800.000 | 1.475689 | 2.087705 | 2.412698 | 2.712348 | 3.048663 | 3.322135 | 4.129167 | 5.183474 | 7.809959 |
| -1000.000 | 1.340627 | 1.741852 | 2.120898 | 2.334636 | 2.535854 | 3.053135 | 3.683982 | 4.716145 | 6.551013 |
| -1250.000 | 1.188876 | 1.536371 | 1.797190 | 1.924582 | 2.282126 | 2.752904 | 3.375925 | 4.451518 | 5.187535 |
| -1500.000 | 1.022552 | 1.352147 | 1.520410 | 1.761718 | 2.163176 | 2.576321 | 3.050430 | 3.866363 | 4.307350 |
| -2000.000 | .862947 | 1.041938 | 1.365583 | 1.620936 | 1.906946 | 2.171283 | 2.618086 | 2.876451 | 3.145808 |
| -3000.000 | .600805 | .914465 | 1.145431 | 1.273804 | 1.487444 | 1.602494 | 1.723289 | 1.838733 | 1.946112 |

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION - | | | | | | | | |
| 3000.000 | 1.242015 | 1.270693 | 1.213124 | 1.174963 | 1.129759 | 1.078897 | 1.009908 | .924725 | .773610 |
| 2000.000 | 2.192536 | 2.246854 | 2.085558 | 1.960184 | 1.814670 | 1.710877 | 1.428858 | 1.255966 | .961216 |
| 1500.000 | 3.258063 | 3.337865 | 3.006055 | 2.725089 | 2.493014 | 2.054230 | 1.729386 | 1.455465 | 1.426758 |
| 1250.000 | 4.172939 | 4.272554 | 3.749706 | 3.350022 | 2.725899 | 2.315758 | 1.893275 | 1.838393 | 1.783701 |
| 1000.000 | 5.605846 | 5.732057 | 4.833446 | 4.159414 | 3.174491 | 2.606588 | 2.477219 | 2.414826 | 2.199683 |
| 800.000 | 7.453122 | 7.617677 | 6.169492 | 4.583254 | 3.591886 | 3.443437 | 3.183569 | 3.016919 | 2.860217 |
| 600.000 | 10.599771 | 10.763703 | 8.299770 | 5.403757 | 4.969984 | 4.492734 | 4.130747 | 4.155256 | 3.644918 |
| 400.000 | 18.082357 | 17.125082 | 9.950397 | 8.015761 | 6.864670 | 6.922053 | 6.624712 | 5.705509 | 4.425239 |
| 200.000 | 32.828838 | 34.847267 | 17.082127 | 16.251079 | 13.173162 | 10.813725 | 8.716227 | 7.180328 | 5.195702 |
| .000 | 63.526520 | 97.718873 | 50.817300 | 30.163562 | 20.863201 | 15.774613 | 11.798674 | 9.253553 | 6.294835 |
| -200.000 | 22.113643 | 36.232011 | 24.189043 | 20.742026 | 15.562080 | 12.254298 | 9.646070 | 7.818186 | 5.540433 |
| -400.000 | 17.536629 | 20.530484 | 14.788746 | 12.719958 | 10.089924 | 9.488625 | 8.268621 | 6.740923 | 4.995657 |
| -600.000 | 12.042532 | 14.269958 | 12.692368 | 9.034563 | 8.365817 | 6.952721 | 6.066908 | 5.691529 | 4.412014 |
| -800.000 | 9.254277 | 10.816631 | 9.480651 | 7.709350 | 6.419793 | 6.026965 | 5.058894 | 4.545649 | 3.902256 |
| -1000.000 | 7.407627 | 8.521041 | 7.578466 | 7.117639 | 5.652883 | 4.843473 | 4.351653 | 3.911429 | 3.252349 |
| -1250.000 | 5.833904 | 6.609003 | 6.042383 | 5.701192 | 4.865727 | 4.278133 | 3.639933 | 3.325712 | 2.828982 |
| -1500.000 | 4.746083 | 5.309840 | 4.946031 | 4.647631 | 4.498111 | 3.792025 | 3.300278 | 2.861965 | 2.449853 |
| -2000.000 | 3.382595 | 3.716567 | 3.538194 | 3.407620 | 3.239875 | 3.179415 | 2.710214 | 2.437233 | 1.946652 |
| -3000.000 | 2.042810 | 2.194115 | 2.131130 | 2.094876 | 2.045759 | 1.985588 | 1.898738 | 1.784493 | 1.533490 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) (CONT.) FROM COMBINED SOURCES 12, -15,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | .534587 |
| 2000.000 | .965940 |
| 1500.000 | 1.289420 |
| 1250.000 | 1.530933 |
| 1000.000 | 1.952140 |
| 800.000 | 2.259086 |
| 600.000 | 2.570432 |
| 400.000 | 2.879373 |
| 200.000 | 3.180338 |
| .000 | 3.621281 |
| -200.000 | 3.319609 |
| -400.000 | 3.113453 |
| -600.000 | 2.893544 |
| -800.000 | 2.663029 |
| -1000.000 | 2.428285 |
| -1250.000 | 2.125853 |
| -1500.000 | 1.896808 |
| -2000.000 | 1.576643 |
| -3000.000 | 1.117217 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | 1.963157 | | | | | | |

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| 200.00 | .00 | 97.718873 |
| .00 | .00 | 63.526520 |
| 400.00 | .00 | 50.817300 |
| 200.00 | -200.00 | 36.232011 |
| 200.00 | 200.00 | 34.847267 |
| .00 | 200.00 | 32.828880 |
| -200.00 | .00 | 30.924355 |
| 600.00 | .00 | 30.163562 |
| 400.00 | -200.00 | 24.189043 |

Figure D-2. (Continued).

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**** ISCLT ***************          HYPOTHETICAL POTASH PROCESSING PLANT          ********* PAGE     62 ****

 **   ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER          ) (CONT.) FROM COMBINED SOURCES     12,   -15,

                              - PROGRAM DETERMINED MAXIMUM 10 VALUES -

                                   X              Y          CONCENTRATION
                              COORDINATE     COORDINATE

                               (METERS)       (METERS )
                              ------------------------------------------
                                    .00         -200.00        22.113643
```

Figure D-2. (Continued).



**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT

** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 16 **

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION - | | | | | | | | |
| 3000.000 | .177388 | .206403 | .224353 | .231732 | .238086 | .244017 | .248679 | .251839 | .253299 |
| 2000.000 | .262836 | .299572 | .329146 | .352823 | .375700 | .392613 | .407280 | .421342 | .430203 |
| 1500.000 | .315146 | .393582 | .427589 | .441203 | .486467 | .523331 | .558733 | .590118 | .615281 |
| 1250.000 | .337194 | .447760 | .505445 | .531094 | .553763 | .608157 | .663994 | .717423 | .761749 |
| 1000.000 | .348631 | .505499 | .593419 | .640245 | .684467 | .713619 | .791383 | .882195 | .968744 |
| 800.000 | .356340 | .531184 | .669128 | .737850 | .811076 | .868618 | .918721 | 1.041089 | 1.182405 |
| 600.000 | .362510 | .545404 | .710254 | .829252 | .950481 | 1.047801 | 1.146891 | 1.234261 | 1.428882 |
| 400.000 | .366933 | .554907 | .726378 | .851822 | 1.021490 | 1.205185 | 1.409165 | 1.580689 | 1.698725 |
| 200.000 | .369447 | .558961 | .731890 | .858707 | 1.030699 | 1.217255 | 1.468172 | 1.806140 | 2.227071 |
| .000 | .366300 | .549441 | .712939 | .830738 | .987386 | 1.152974 | 1.367003 | 1.630541 | 1.880698 |
| -200.000 | .340810 | .491515 | .612776 | .691381 | .783247 | .862310 | .931043 | .942385 | .932741 |
| -400.000 | .314343 | .431723 | .510932 | .552148 | .585637 | .602868 | .641129 | .648416 | .655884 |
| -600.000 | .287412 | .372359 | .413460 | .431791 | .464835 | .484489 | .488544 | .499746 | .772670 |
| -800.000 | .260512 | .315514 | .350004 | .370944 | .385860 | .388144 | .397685 | .561508 | .782614 |
| -1000.000 | .234092 | .276749 | .306851 | .317412 | .320159 | .327767 | .435536 | .574932 | .731618 |
| -1250.000 | .202313 | .243834 | .259484 | .261213 | .282965 | .356772 | .447883 | .557012 | .632742 |
| -1500.000 | .182741 | .212972 | .219482 | .235243 | .300394 | .364062 | .438616 | .515437 | .554778 |
| -2000.000 | .153067 | .164167 | .209063 | .252129 | .301421 | .346423 | .390791 | .416663 | .441087 |
| -3000.000 | .106405 | .160864 | .205795 | .231034 | .255781 | .269101 | .282105 | .294530 | .306096 |

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - GRID SYSTEM RECEPTORS - - X AXIS (DISTANCE, METERS) - - CONCENTRATION - | | | | | | | | |
| 3000.000 | .252909 | .250599 | .236267 | .224672 | .210196 | .195198 | .176232 | .158904 | .133239 |
| 2000.000 | .432750 | .428300 | .393528 | .354720 | .314131 | .273719 | .238035 | .206579 | .154824 |
| 1500.000 | .626724 | .621596 | .549990 | .470492 | .390469 | .334718 | .275036 | .225804 | .210273 |
| 1250.000 | .785215 | .781430 | .669346 | .547059 | .443108 | .366138 | .287495 | .250401 | .260877 |
| 1000.000 | 1.016240 | 1.017212 | .827679 | .629927 | .495344 | .387347 | .323934 | .336264 | .320399 |
| 800.000 | 1.277606 | 1.284981 | .978195 | .706647 | .519964 | .406508 | .429769 | .421428 | .373868 |
| 600.000 | 1.621313 | 1.612940 | 1.104953 | .740714 | .540227 | .578071 | .562408 | .520705 | .474070 |
| 400.000 | 1.895364 | 1.743761 | 1.058787 | .727997 | .828626 | .804594 | .757682 | .704419 | .587385 |
| 200.000 | 1.916890 | .731186 | .828559 | 1.257913 | 1.328210 | 1.229415 | 1.063197 | .916288 | .702750 |
| .000 | 1.309162 | .000000 | 1.733320 | 2.202352 | 1.902989 | 1.599053 | 1.294904 | 1.073248 | .787341 |
| -200.000 | .942606 | 1.648424 | 1.110660 | 1.339593 | 1.356484 | 1.245492 | 1.079834 | .932596 | .715675 |
| -400.000 | 1.189155 | 1.458144 | .975513 | .810881 | .907010 | .925803 | .868320 | .787926 | .639593 |
| -600.000 | 1.066731 | 1.184695 | .886131 | .728193 | .630610 | .671910 | .683353 | .653276 | .563375 |
| -800.000 | .913063 | .995926 | .803378 | .650122 | .575231 | .508085 | .533387 | .536760 | .491873 |
| -1000.000 | .797671 | .853177 | .721016 | .590647 | .525060 | .470768 | .417113 | .439542 | .428223 |
| -1250.000 | .680480 | .719658 | .631379 | .540664 | .470210 | .429528 | .381510 | .343402 | .358744 |
| -1500.000 | .590468 | .619735 | .557461 | .492203 | .429022 | .392937 | .355017 | .319683 | .300667 |
| -2000.000 | .462939 | .481129 | .446515 | .409629 | .372378 | .336189 | .308451 | .284526 | .239362 |
| -3000.000 | .316532 | .325584 | .311389 | .296176 | .280391 | .264355 | .244410 | .226224 | .200277 |

Figure D-2. (Continued).

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** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 16 (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | .091826 |
| 2000.000 | .152286 |
| 1500.000 | .200150 |
| 1250.000 | .227351 |
| 1000.000 | .275918 |
| 800.000 | .322264 |
| 600.000 | .370191 |
| 400.000 | .418676 |
| 200.000 | .466584 |
| .000 | .501958 |
| -200.000 | .473665 |
| -400.000 | .443613 |
| -600.000 | .412442 |
| -800.000 | .380919 |
| -1000.000 | .349740 |
| -1250.000 | .313713 |
| -1500.000 | .281734 |
| -2000.000 | .226120 |
| -3000.000 | .156546 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | .363236 | | | | | | |

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 16,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| -200.00 | 200.00 | 2.227071 |
| 600.00 | .00 | 2.202352 |
| .00 | 200.00 | 1.916890 |
| 800.00 | .00 | 1.902989 |
| .00 | 400.00 | 1.895364 |
| -200.00 | .00 | 1.880698 |
| -400.00 | 200.00 | 1.806140 |
| 200.00 | 400.00 | 1.743761 |
| 400.00 | .00 | 1.733320 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 16 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 16.

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| -200.00 | 400.00 | 1.698725 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) DUE TO SOURCE 2 **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES -16,

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| 200.00 | .00 | 3.572526 |
| -200.00 | .00 | 2.025068 |
| .00 | -200.00 | 1.988977 |
| .00 | 200.00 | 1.371331 |
| -200.00 | 200.00 | .846305 |
| 400.00 | .00 | .985294 |
| 200.00 | -200.00 | .954055 |
| -400.00 | .00 | .634153 |
| .00 | -400.00 | .615843 |
| -200.00 | -200.00 | .571056 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) FROM COMBINED SOURCES -16,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| | - CONCENTRATION - | | | | | | | | |
| 3000.000 | 15.701092 | 18.942432 | 20.378169 | 21.106735 | 21.468597 | 21.940981 | 22.238572 | 22.328986 | 22.185686 |
| 2000.000 | 25.817565 | 31.414241 | 35.934766 | 38.644588 | 40.841823 | 41.953043 | 43.660832 | 44.728065 | 44.871413 |
| 1500.000 | 32.591661 | 45.095850 | 51.721999 | 55.469636 | 61.732574 | 66.077491 | 69.644453 | 72.491918 | 73.924355 |
| 1250.000 | 36.934844 | 54.020829 | 64.782055 | 71.037457 | 77.402421 | 85.574888 | 92.272807 | 97.488152 | 101.097733 |
| 1000.000 | 38.781167 | 63.997718 | 82.517870 | 92.654721 | 104.832087 | 113.097446 | 127.827990 | 142.474731 | 147.493542 |
| 800.000 | 40.264640 | 73.043536 | 98.909375 | 116.168270 | 134.847670 | 154.581869 | 170.220734 | 197.120735 | 215.942266 |
| 600.000 | 41.476315 | 77.713091 | 118.804207 | 143.453426 | 177.337866 | 209.558378 | 258.001373 | 296.864479 | 343.927803 |
| 400.000 | 42.365130 | 81.431193 | 127.651506 | 167.646616 | 234.961256 | 292.443138 | 384.760208 | 532.770309 | 641.116722 |
| 200.000 | 42.870509 | 83.669175 | 134.012341 | 179.685417 | 255.219542 | 365.120029 | 565.713493 | 904.547623 | 1644.341263 |
| .000 | 43.592019 | 85.954903 | 139.377890 | 188.945707 | 273.457855 | 401.628742 | 653.284927 | 1243.427567 | 2998.831696 |
| -200.000 | 39.835278 | 74.932621 | 115.795543 | 150.905167 | 205.434942 | 278.733051 | 395.282951 | 536.374367 | 1056.221741 |
| -400.000 | 36.848078 | 65.893711 | 96.075214 | 118.878694 | 151.880154 | 179.613321 | 237.417061 | 361.177841 | 671.299797 |
| -600.000 | 33.672222 | 56.360411 | 76.478976 | 88.954096 | 111.008204 | 132.732883 | 177.348738 | 282.305092 | 475.403450 |
| -800.000 | 30.394194 | 46.913946 | 61.993407 | 73.732883 | 87.099301 | 107.157834 | 152.607111 | 226.863289 | 322.274128 |
| -1000.000 | 27.087202 | 40.134638 | 52.916087 | 60.472929 | 73.201359 | 97.970929 | 135.935869 | 193.646418 | 232.107430 |
| -1250.000 | 23.260803 | 34.686741 | 42.876585 | 49.930770 | 67.950522 | 89.044238 | 114.379989 | 145.433096 | 167.666132 |
| -1500.000 | 20.612502 | 29.705405 | 36.559303 | 47.410013 | 63.287587 | 78.568563 | 99.212747 | 114.173650 | 127.385117 |
| -2000.000 | 16.924355 | 22.437645 | 34.231482 | 42.399836 | 51.831877 | 61.492023 | 68.927876 | 75.700367 | 81.516409 |
| -3000.000 | 11.379469 | 20.370844 | 26.793392 | 31.048478 | 34.189552 | 36.668157 | 39.005111 | 41.128579 | 42.961977 |

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE, METERS) | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|
| | - CONCENTRATION - | | | | | | | |
| 3000.000 | 22.155703 | 20.867685 | 19.857788 | 18.733391 | 17.504958 | 16.205052 | 14.709987 | 13.354785 | 11.291737 |
| 2000.000 | 45.009141 | 40.985526 | 37.646802 | 33.881024 | 29.922047 | 26.702922 | 23.466038 | 20.497890 | 16.160378 |
| 1500.000 | 74.710657 | 65.684319 | 57.857405 | 49.629642 | 42.239754 | 36.623999 | 30.389843 | 26.660464 | 25.990121 |
| 1250.000 | 102.992134 | 87.934212 | 74.573303 | 60.688537 | 51.432569 | 43.070980 | 36.720276 | 35.892703 | 32.831677 |
| 1000.000 | 152.382677 | 124.216688 | 101.376021 | 78.552341 | 62.854875 | 54.440372 | 52.157870 | 49.217071 | 40.826198 |
| 800.000 | 227.974852 | 174.743849 | 126.921836 | 96.666831 | 80.665323 | 76.007097 | 70.030441 | 62.235558 | 51.617862 |
| 600.000 | 380.971508 | 261.831093 | 174.588928 | 135.224356 | 120.496555 | 108.447457 | 91.837861 | 84.606634 | 66.501011 |
| 400.000 | 762.477081 | 399.420902 | 280.357494 | 225.959570 | 184.085079 | 169.302917 | 139.970036 | 115.961161 | 81.872684 |
| 200.000 | 2073.599854 | 861.179192 | 547.402039 | 463.210762 | 339.661007 | 256.199287 | 191.161726 | 148.128387 | 96.982635 |
| .000 | 216.616867 | 3375.378967 | 1533.565567 | 833.151871 | 521.127014 | 358.781544 | 249.389673 | 184.559494 | 114.208215 |
| -200.000 | 2601.409058 | 1355.422791 | 849.287483 | 607.372620 | 415.109077 | 300.618282 | 217.486170 | 165.090382 | 105.316413 |
| -400.000 | 1182.062714 | 656.907669 | 489.456551 | 369.245255 | 289.197670 | 245.058674 | 185.011816 | 145.498962 | 96.740184 |
| -600.000 | 638.428368 | 447.891403 | 310.392696 | 245.009705 | 203.847141 | 176.207712 | 144.946302 | 124.706807 | 87.007627 |
| -800.000 | 397.935459 | 309.444393 | 226.936281 | 177.814844 | 149.494568 | 132.213593 | 116.066372 | 100.246495 | 76.928730 |
| -1000.000 | 273.331772 | 225.342815 | 183.569214 | 144.995283 | 118.199018 | 102.496265 | 91.539205 | 82.774085 | 65.524164 |
| -1250.000 | 190.533096 | 163.967846 | 138.245621 | 112.791331 | 96.917948 | 82.153031 | 70.070422 | 64.280018 | 54.865705 |
| -1500.000 | 141.434347 | 125.071483 | 109.416309 | 93.288658 | 79.999403 | 69.970551 | 58.662344 | 51.381015 | 45.464022 |
| -2000.000 | 87.999302 | 80.411623 | 73.340938 | 65.550113 | 57.505476 | 51.478241 | 45.524371 | 40.008355 | 31.604344 |
| -3000.000 | 45.152909 | 42.599794 | 40.296408 | 37.780454 | 35.088275 | 32.283963 | 29.073747 | 26.441663 | 22.449233 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) (CONT.) FROM COMBINED SOURCES -16,
- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - CONCENTRATION - |
|---|---|
| 3000.000 | 8.063892 |
| 2000.000 | 15.465553 |
| 1500.000 | 20.845341 |
| 1250.000 | 24.778264 |
| 1000.000 | 31.102125 |
| 800.000 | 36.393093 |
| 600.000 | 41.756608 |
| 400.000 | 47.080215 |
| 200.000 | 52.231333 |
| .000 | 58.195716 |
| -200.000 | 55.227629 |
| -400.000 | 52.537358 |
| -600.000 | 49.494904 |
| -800.000 | 46.202988 |
| -1000.000 | 42.749019 |
| -1250.000 | 38.584816 |
| -1500.000 | 33.734876 |
| -2000.000 | 26.509442 |
| -3000.000 | 16.056299 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | CONCENTRATION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | 34.482232 | | | | | | |

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| 200.00 | .00 | 3375.378967 |
| -200.00 | .00 | 2998.831696 |
| .00 | -200.00 | 2601.409058 |
| .00 | 200.00 | 2070.599854 |
| -200.00 | 200.00 | 1644.341263 |
| 400.00 | .00 | 1533.565567 |
| 200.00 | -200.00 | 1355.422791 |
| -400.00 | .00 | 1243.427567 |
| .00 | -400.00 | 1182.062714 |

Figure D-2. (Continued).



** ANNUAL GROUND LEVEL CONCENTRATION ( MICROGRAMS PER CUBIC METER ) (CONT.) FROM COMBINED SOURCES -16.

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | CONCENTRATION |
|---|---|---|
| -200.00 | -200.00 | 1056.221741 |

Figure D-2. (Continued).



- SUMMARY OF SOURCES OUTPUT TO TAPE -

| NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE | NUMBER/TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 | 2 1 | 3 1 | 4 1 | 5 1 | 6 1 | 7 1 | 8 1 | 9 1 | 10 1 | 11 1 |
| 12 1 | 13 1 | 14 1 | 15 1 | 16 0 | | | | | | |

considered, the default option was not incorporated, a pollutant other than $SO_2$ was modeled and an input debug mode was not used, respectively. ISW(25) was left blank indicating that no receptors were located above ground level.

c. Card Group 3. Card Group 3 specifies the number of categories of meteorological data and the number of sources and receptors in the grid system. The parameter NSOURC is set equal to "16" for the 16 sources used to model the hypothetical potash plant. The parameter NGROUP equals "5" because we wish to print the output for five different source groupings. The parameters NXPNTS and NYPNTS are both set equal to "19" for the 19-X by 19-Y receptor grid system shown in Figure 2-1. The parameter NXWYPT is set to "1" and specifies one discrete point that is used in this example to represent an air quality monitor location. The parameters NSEASN through NSCTOR are all left blank so that they assume their respective default values of 1 season, 6 wind-speed categories, 6 stability categories and 16 wind-direction categories. The parameter NOFILE is set to equal to "1," because the tape output file will be the first file on tape.

d. Card Groups 4 and 4a. Card Groups 4 and 4a define the source combinations for which concentration or deposition output is to be produced. The parameter NGROUP on Card Group 3 specifies 5 source combinations. Card Group 4 (NOCOMB) gives the number of source ID-numbers the program is to use to define each source combination. The first output combination has one defining source, the second and third use two defining sources and the fourth and fifth use only one. Card Group 4a shows the actual source ID-numbers the program is to use in each source combination. The program is to output annual concentrations for Source 1, Sources 2 through 11 combined, Sources 12 through 15 combined, Sources 16, and all sources (1-16) combined.

e. Card Group 5. Card Group 5 specifies the output concentration units and input source emission units. Because we wish to use the program default units, this card is left blank. However, this card is still included in the input data deck. The output units are defaulted to "micrograms per cubic meter" and input source emission units are defaulted to "gram per sec" for the stack and volume sources and to "grams per sec per square meter" for the area source as shown in Figure D-2.

f. Card Groups 6, 6a, 7, and 7a. Card Groups 6, 6a, 7, and 7a define the locations of the receptors of the regular (non-discrete) grid system and the discrete point. The regular grid system (Card Groups 6 and 7) is in Cartesian coordinates and the discrete receptor (Card Groups 6a and 7a) is in polar coordinates.

g. Card Groups 8, 8a, 8b, and 8c. Card Groups 8 and 8a are not shown in Figure D-1 because we are assuming flat terrain (ISW(4) equal to "0"). Card Groups 8b and 8c are not shown in Figure D-1 because no receptor heights were located above ground level (ISW(25) equal to "0").

h. Card Group 9. Card Group 9 is used to specify an optional format the program uses to read Card Group 9a. Because ISW(18) is left blank (zero), this card group is not used by the program and is omitted from the input deck. The program will use the default FORTRAN format of (6F10.0) to read the data shown in Card Group 9a. This default format requires the user to punch the frequency of occurrence data in Card Group 9a using 10 columns per value including the decimal point (period). NSPEED values are read per data card in Card Group 9a.

i. Card Group 9a. Card Group 9a gives the joint frequency of occurrence of wind speed and direction by stability category and season. As the example run is using annual data, only one season (annual) is punched. Within this one season, there are six stability categories (A through F) and within each stability category there are sixteen cards, one for each wind direction category clockwise from north to north-northwest. Each data card contains the frequency of occurrence for the six wind-speed categories. Values that are zero have been left blank because the ISCLT program interprets blanks as zeroes. If we were using seasonal data in the example problem, the program would require NSEASN decks to be input.

j. Card Group 10. Card Group 10 gives the annual ambient air temperatures in degrees Kelvin for stability categories A through F.

k. Card Group 11. Card Group 11 gives the annual mixing heights in meters by stability and wind-speed. The mixing heights are punched, six values per card, for wind-speed categories 1 through 6, and there are six cards for stability categories A through F. If we were using seasonal data in this example run, the program would require NSEASN groups of these data cards. For the purpose of this example, it is assumed that the median mixing heights shown in Figure D-1 have been developed as a function of wind-speed and stability using on-site acoustic radar data. Some values have been left blank in this card group for stability categories A through D because the joint frequency of occurrence of these wind-speed and stability categories is zero (and no calculations will take place). The values for stability categories E and F have been left blank because the case is being run in the Rural Mode and the program automatically uses 10,000 meters. Note also that

the decimal point is not punched. The decimal point can be eliminated in real variables only when the value is a whole number and right justified in the respective punch columns.

1. Card Groups 12 through 16. Card Groups 12 through 16 provide the remaining meteorological and model data. These card groups are all blank, but must be included in the input data deck. The program provides default values for all of these data items and their respective values are shown in Figure D-2 under the "ISCLT INPUT DATA" heading.

m. Card Group 17. Card Group 17 provides all of the information concerning sources 1 through 16. The parameter DISP is blank (zero) for each source as this run is the initial entry of these sources and there is no input tape. The parameter TYPE identifies the type of source ("0" = stack "1" = volume, "2" = area) and QFLG specifies how the source emissions vary. The emissions from Sources 1 through 11 vary with wind-speed category and stability category, while the emissions from Sources 12 through 16 are assumed constant. Card Group 17 also gives the location, height, exit temperature, and exit velocity or dimensions (depending on the source type), inner diameter of the stack, and the height and width of the building for the consideration of wake effects for stack emissions. As we are calculating particulate concentrations, the parameter NVS has been set to the number (6) of particulate size categories used to define the particulate distributions of Sources 1 through 11. However, the particulate emissions from Sources 12 through 16 are assumed to have negligible gravitational settling velocities and are treated as gaseous emissions. Therefore, for Sources 1 through 11, the particulate settling velocity (VS), mass fraction of the distribution (FRQ) and the surface reflection coefficient for each of the six particulate

size categories must be input. Since the building height has not been entered as a negative value for source 16 and the regulatory default mode was not selected (ISW(22) = "1"), no direction specific building dimensions are read for the 16 sectors (NSCTOR). The next six cards for each source, if necessary, specify the emissions of a particular source. There is one card for each stability category with six values across the card for the wind-speed categories. If we were using seasonal data in this example, the program would require NSEASN groups of these cards for Source 1 because QFLG for this source is set to "3." In some cases, the source emissions are blank because the frequency of occurrence of wind-speed and wind-direction is zero.

D.2.2 Example Print Output

Figure D-2 illustrates the printed concentration output for the example hypothetical potash plant. The listing begins by printing the input data under the heading "ISCLT INPUT DATA." This part of the output listing includes all punched data and default values, except source data. Next, the source data are listed under the heading "SOURCE INPUT DATA." Note that the source input data listing also contains warning messages indicating a source is too close to a receptor. Concentrations are not calculated for those source-receptor combinations. The remainder of the output listing in Figure D-2 shows the annual particulate concentrations due to selected sources, but does not show the complete output listing. The page number of each table in the output listing is shown in the upper right hand corner. For example, pages 12, 13, and 14 (upper right hand corner) show the complete output for Source 1. The heading given is "ANNUAL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 1." The particulate concentrations calculated for the receptor grid system follow the page heading on page 12 and end at the middle of page 13. The concentrations at the discrete receptors are then printed, followed by the maximum 10 values. The maximum 10 values listed here

were derived from Source 1 alone as there were no other sources in this particular source combination. The next concentration tables illustrated are from pages 15 through 17 of the output listing. These pages give the individual concentrations produced by Source 2 that contribute to the combined Sources 2 through 11. The individual source output is printed because ISW(8) was input as "3." Note that the maximum 10 values for Source 2 on page 16 are actually those 10 receptors from Source 2 that contribute to the maximum 10 values of the combined Sources 2 through 11. Although not shown in Figure D-2, the output listing continues printing tables for Sources 3 through 11 with the same form and content as shown for Source 2 on page 15 through 17. The next concentration tables illustrated are from pages 45 through 47 of the output listing. These pages show the combined particulate concentrations for Sources 2 through 11 with the maximum 10 values and receptors for the combined Sources 2 through 11. Figure D-2 continues with output pages 60 through 62 showing the combined source output for Sources 12 through 15. The output for Source 16 is shown on pages 63 through 65. The ISCLT program then continues to print the 10 values from each of Sources 1 through 16 that contribute to the maximum 10 of all 16 sources combined (only Source 2 is shown). The program only displays the 10 values that contribute to the maximum 10 because the calculations for all receptor points for each source have been displayed earlier in the output listing. The output listing for this example is terminated on output page 85 with a summary of the source ID-number and source type of each source output to tape with the respective calculated concentrations.

## D.3 Example Dry Deposition Run

This ISCLT program example run calculates the total annual ground-level dry deposition from the same hypothetical potash processing plant described in Section D.2. This particular example is modeled using 11 out of the original

16 sources. Only the first 11 sources are used here because Sources 12 through 16 are assumed to be emitting only submicron particulates that are assumed to be completely reflected at the ground surface and thus do not contribute to the ground-level deposition.

### D.3.1 Input Data Set-Up Procedures

The input card data set-up procedure for this example is the same as that used in Section D.2 for the example concentration run and is shown in Figure D-3. However, there are differences between this runstream and the runstream used in the concentration example. The parameters ISW(1) and ISW(5) on Card Group 2 are changed to the values "2" and "1", respectively, indicating deposition is to be calculated and no output tape is used. Card Groups 3 through 4a show the number of input sources (NSOURC), which is reduced to 11, and the number of output source combinations (NGROUP), which is reduced to 3. Also, Card Group 17 shows the new emission rates for Sources 1 through 11 for deposition calculations. The only other change in the input deck is the removal of Card Group 17 for Sources 12 through 16.

### D.3.2 Example Print Output

Figure D-4 illustrates a table of printed deposition output for the example hypothetical potash plant. The table shows the annual ground-level deposition in grams per square meter due to Sources 1 through 11 combined and can be used to verify if the model is working correctly.

| CARD GROUP | CARD NUMBER | CARD COLUMN 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
|---|---|---|
| 1 | 1 | |
| 2 | 2 | HYPOTHETICAL POTASH PROCESSING PLANT |
| 3 | 3 | 2 2 3 2 3 3 2 2 1 1 1 1 1 0 |
| 4 | 4 | 11 3 19 19 1 |
| 4a | 5 | 1 2 1 |
| 5 | 6 | 1 2 -11 -11 |
| 6 | 7 | |
| | 8 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 9 | -200 0 200 400 600 800 1000 1250 |
| 7 | 10 | 1500 2000 3000 |
| | 11 | -3000 -2000 -1500 -1250 -1000 -800 -600 -400 |
| | 12 | -200 0 200 400 600 800 1000 1250 |
| 6a 7a | 13 | 1500 2000 3000 |
| 9a | 14 | 2108. 14. |
| | 15 | .0001695 .0000856 .0000000 .0000000 .0000000 .0000000 |
| | 16 | .0001083 .0001993 .0000000 .0000000 .0000000 .0000000 |
| | 17 | .0000918 .0001993 .0000000 .0000000 .0000000 .0000000 |
| | 18 | .0001076 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 19 | .0003119 .0005995 .0000000 .0000000 .0000000 .0000000 |
| | 20 | .0003621 .0005139 .0000000 .0000000 .0000000 .0000000 |
| | 21 | .0003365 .0003426 .0000000 .0000000 .0000000 .0000000 |
| | 22 | .0006953 .0007993 .0000000 .0000000 .0000000 .0000000 |
| | 23 | .0006747 .0008564 .0000000 .0000000 .0000000 .0000000 |
| | 24 | .0005512 .0005424 .0000000 .0000000 .0000000 .0000000 |
| | 25 | .0001441 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 26 | .0001155 .0002855 .0000000 .0000000 .0000000 .0000000 |
| | 27 | .0002999 .0002569 .0000000 .0000000 .0000000 .0000000 |
| | 28 | .0000839 .0001713 .0000000 .0000000 .0000000 .0000000 |
| | 29 | .0000602 .0000856 .0000000 .0000000 .0000000 .0000000 |
| | 30 | .0002820 .0002284 .0000000 .0000000 .0000000 .0000000 |
| | 31 | .0007353 .0007708 .0005710 .0000000 .0000000 .0000000 |
| | 32 | .0010488 .0010848 .0004853 .0000000 .0000000 .0000000 |
| | 33 | .0004444 .0006851 .0001993 .0000000 .0000000 .0000000 |
| | 34 | .0009629 .0014845 .0008564 .0000000 .0000000 .0000000 |
| | 35 | .0018775 .0027977 .0016843 .0000000 .0000000 .0000000 |
| | 36 | .0016892 .0027977 .0027691 .0000000 .0000000 .0000000 |
| | 37 | .0019770 .0031688 .0034257 .0000000 .0000000 .0000000 |
| | 38 | .0026238 .0039967 .0042536 .0000000 .0000000 .0000000 |
| | 39 | .0045918 .0042251 .0028548 .0000000 .0000000 .0000000 |
| | 40 | .0026274 .0030832 .0010563 .0000000 .0000000 .0000000 |
| | 41 | .0014567 .0010848 .0006281 .0000000 .0000000 .0000000 |
| | 42 | .0016527 .0021125 .0007137 .0000000 .0000000 .0000000 |
| | 43 | .0024999 .0021125 .0011134 .0000000 .0000000 .0000000 |
| | 44 | .0013425 .0011990 .0007709 .0000000 .0000000 .0000000 |
| | 45 | .0009151 .0006851 .0004568 .0000000 .0000000 .0000000 |
| | 46 | .0007325 .0007422 .0003711 .0000000 .0000000 .0000000 |
| | 47 | .0004645 .0009421 .0010561 .0001427 .0000285 .0000000 |
| | 48 | .0006990 .0007993 .0015130 .0004853 .0001427 .0000285 |
| | 49 | .0002668 .0007422 .0009421 .0004282 .0000285 .0000000 |
| | 50 | .0005317 .0014559 .0015701 .0004282 .0000571 .0000000 |
| | | .0006882 .0027977 .0058523 .0007137 .0000856 .0000000 |

Figure D-3. Card input data values for the hypothetical potash processing plant deposition run.

| CARD GROUP | CARD NUMBER | CARD COLUMN 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 51 | .0006961 | .0037683 | .0069657 | .0021125 | .0001427 | .0000000 | | | | | | | | | | |
| | 52 | .0005842 | .0030546 | .0075652 | .0031689 | .0001713 | .0000000 | | | | | | | | | | |
| | 53 | .0006083 | .0042536 | .0081076 | .0025978 | .0001998 | .0000000 | | | | | | | | | | |
| | 54 | .0011771 | .0040823 | .0051101 | .0006281 | .0001142 | .0000285 | | | | | | | | | | |
| | 55 | .0007716 | .0035399 | .0024551 | .0002569 | .0001142 | .0000856 | | | | | | | | | | |
| | 56 | .0006050 | .0016272 | .0020269 | .0004568 | .0000856 | .0001427 | | | | | | | | | | |
| | 57 | .0008245 | .0038539 | .0028833 | .0005139 | .0001713 | .0003426 | | | | | | | | | | |
| | 58 | .0014135 | .0043964 | .0059665 | .0011134 | .0002855 | .0003426 | | | | | | | | | | |
| | 59 | .0008536 | .0021125 | .0033972 | .0005139 | .0002569 | .0002284 | | | | | | | | | | |
| | 60 | .0003503 | .0010563 | .0013417 | .0001713 | .0000571 | .0000285 | | | | | | | | | | |
| | 61 | .0006561 | .0010563 | .0009421 | .0001142 | .0000571 | .0000000 | | | | | | | | | | |
| | 62 | .0009550 | .0025978 | .0079077 | .0136744 | .0112764 | .0102772 | | | | | | | | | | |
| | 63 | .0006897 | .0027406 | .0083784 | .0134745 | .0080790 | .0050530 | | | | | | | | | | |
| | 64 | .0003904 | .0018843 | .0065945 | .0055383 | .0020554 | .0005424 | | | | | | | | | | |
| | 65 | .0008483 | .0040323 | .0086214 | .0061663 | .0011419 | .0001998 | | | | | | | | | | |
| | 66 | .0019828 | .0061949 | .0149019 | .0124754 | .0019412 | .0002284 | | | | | | | | | | |
| | 67 | .0013385 | .0053304 | .0166148 | .0184133 | .0030259 | .0004853 | | | | | | | | | | |
| | 68 | .0007174 | .0035359 | .0090782 | .0119044 | .0017129 | .0001993 | | | | | | | | | | |
| | 69 | .0009847 | .0034257 | .0065945 | .0070228 | .0011990 | .0002569 | | | | | | | | | | |
| | 70 | .0010097 | .0037683 | .0046318 | .0045105 | .0012561 | .0006281 | | | | | | | | | | |
| | 71 | .0005797 | .0029119 | .0021411 | .0034257 | .0013132 | .0004853 | | | | | | | | | | |
| | 72 | .0004980 | .0013703 | .0022553 | .0034543 | .0019983 | .0012561 | | | | | | | | | | |
| | 73 | .0005598 | .0017905 | .0050530 | .0056388 | .0028548 | .0020340 | | | | | | | | | | |
| | 74 | .0012231 | .0045962 | .0091353 | .0148443 | .0079077 | .0057667 | | | | | | | | | | |
| | 75 | .0006990 | .0020269 | .0074224 | .0141597 | .0106198 | .0065945 | | | | | | | | | | |
| | 76 | .0005355 | .0018842 | .0051101 | .0075937 | .0029404 | .0019412 | | | | | | | | | | |
| | 77 | .0007400 | .0021696 | .0065374 | .0055954 | .0026264 | .0015937 | | | | | | | | | | |
| | 78 | .0000000 | .0052528 | .0095064 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 79 | .0000000 | .0032544 | .0076794 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 80 | .0000000 | .0017700 | .0057096 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 81 | .0000000 | .0033696 | .0075937 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 82 | .0000000 | .0049673 | .0097062 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 83 | .0000000 | .0027406 | .0056239 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 84 | .0000000 | .0017700 | .0027406 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 85 | .0000000 | .0023695 | .0018271 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 86 | .0000000 | .0024551 | .0015701 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 87 | .0000000 | .0016271 | .0013132 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 88 | .0000000 | .0016558 | .0019983 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 89 | .0000000 | .0034257 | .0055383 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 90 | .0000000 | .0066802 | .0111622 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 91 | .0000000 | .0049959 | .0070228 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 92 | .0000000 | .0035685 | .0063091 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 93 | .0000000 | .0052242 | .0089925 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 94 | .0068412 | .0097348 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 95 | .0037307 | .0055954 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 96 | .0024779 | .0043107 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 97 | .0028384 | .0049388 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 98 | .0047532 | .0077364 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 99 | .0030647 | .0049102 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 100 | .0032044 | .0028262 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 101 | .0035623 | .0023695 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 102 | .0047073 | .0031688 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 103 | .0048615 | .0041680 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 104 | .0029674 | .0034257 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 105 | .0059074 | .0094493 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 106 | .0117078 | .0205544 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |
| | 107 | .0074288 | .0120472 | .0000000 | .0000000 | .0000000 | .0000000 | | | | | | | | | | |

Figure D-3. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | |
| | 108 | .0062942 | | .0098204 | | .0000000 | | .0000000 | | .0000000 | | .0000000 | | | | | | |
| | 109 | .0076137 | | .0128180 | | .0000000 | | .0000000 | | .0000000 | | .0000000 | | | | | | |
| 10 | 110 | 287.2 | | 287.2 | | 283.2 | | 280.8 | | 279.1 | | 279.1 | | | | | | |
| 11 | 111 | 1730 | | 1730 | | | | | | | | | | | | | | |
| | 112 | 1730 | | 1730 | | 1730 | | | | | | | | | | | | |
| | 113 | 960 | | 1025 | | 1235 | | 1295 | | 1295 | | 1295 | | | | | | |
| | 114 | 320 | | 500 | | 840 | | 840 | | 840 | | 840 | | | | | | |
| | 115 | | | | | | | | | | | | | | | | | |
| | 116 | | | | | | | | | | | | | | | | | |
| 12 | 117 | | | | | | | | | | | | | | | | | |
| | 118 | | | | | | | | | | | | | | | | | |
| | 119 | | | | | | | | | | | | | | | | | |
| | 120 | | | | | | | | | | | | | | | | | |
| | 121 | | | | | | | | | | | | | | | | | |
| | 122 | | | | | | | | | | | | | | | | | |
| 13 | 123 | | | | | | | | | | | | | | | | | |
| 14 | 124 | | | | | | | | | | | | | | | | | |
| 15 | 125 | | | | | | | | | | | | | | | | | |
| | 126 | | | | | | | | | | | | | | | | | |
| 16 | 127 | | | | | | | | | | | | | | | | | |
| | 128 | | | | | | | | | | | | | | | | | |
| | 129 | | | | | | | | | | | | | | | | | |
| | 130 | | | | | | | | | | | | | | | | | |
| | 131 | | | | | | | | | | | | | | | | | |
| | 132 | | | | | | | | | | | | | | | | | |
| 17 | 133 | 1 23 | | -13.3 | | -13.3 | | 10 | | 26.6 | | | | | | | | 6 |
| | 134 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | |
| | 135 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | | |
| | 136 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | | |
| | 137 | 1.26E7 | | 1.58E7 | | | | | | | | | | | | | | |
| | 138 | 9.46E6 | | 1.26E7 | | 1.58E7 | | | | | | | | | | | | |
| | 139 | 6.31E6 | | 9.46E6 | | 1.26E7 | | 1.58E7 | | 2.21E7 | | 3.15E7 | | | | | | |
| | 140 | 3.15E7 | | 7.88E6 | | 1.26E7 | | 1.58E7 | | 2.21E7 | | 3.15E7 | | | | | | |
| | 141 | | | 6.31E6 | | 9.46E6 | | | | | | | | | | | | |
| | 142 | 1.58E6 | | 3.15E6 | | | | | | | | | | | | | | |
| | 143 | 2 13 | | 20 | | 0 | | .9 | | 4.7 | | 1.0 | | | | | | 6 |
| | 144 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | |
| | 145 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | | |
| | 146 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | | |
| | 147 | 4.10E6 | | 5.05E6 | | | | | | | | | | | | | | |
| | 148 | 3.15E6 | | 4.10E6 | | 5.05E6 | | | | | | | | | | | | |
| | 149 | 2.52E6 | | 3.78E6 | | 4.42E6 | | 5.05E6 | | 5.99E6 | | 6.94E6 | | | | | | |
| | 150 | 1.26E6 | | 3.15E6 | | 4.10E6 | | 5.05E6 | | 5.99E6 | | 6.94E6 | | | | | | |
| | 151 | | | 2.52E6 | | 3.15E6 | | | | | | | | | | | | |
| | 152 | 6.31E5 | | 1.58E6 | | | | | | | | | | | | | | |
| | 153 | 3 13 | | 30 | | 0 | | 2.6 | | 4.7 | | 1.0 | | | | | | 6 |
| | 154 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | |
| | 155 | .10 | | .40 | | .28 | | .12 | | .06 | | .04 | | | | | | |
| | 156 | 1.0 | | .82 | | .72 | | .65 | | .59 | | .50 | | | | | | |
| | 157 | 4.10E6 | | 5.05E6 | | | | | | | | | | | | | | |
| | 158 | 3.15E6 | | 4.10E6 | | 5.05E6 | | | | | | | | | | | | |
| | 159 | 2.52E6 | | 3.78E6 | | 4.42E6 | | 5.05E6 | | 5.99E6 | | 6.94E6 | | | | | | |
| | 160 | 1.26E6 | | 3.15E6 | | 4.10E6 | | 5.05E6 | | 5.99E6 | | 6.94E6 | | | | | | |
| | 161 | | | 2.52E6 | | 3.15E6 | | | | | | | | | | | | |
| | 162 | 6.31E5 | | 1.58E6 | | | | | | | | | | | | | | |
| | 163 | 4 13 | | 40 | | 0 | | 4.3 | | 4.7 | | 1.0 | | | | | | 6 |
| | 164 | .001 | | .007 | | .019 | | .037 | | .061 | | .099 | | | | | | |

Figure D-3. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 |
|---|---|---|
| | 165 | .10 .40 .28 .12 .06 .04 |
| | 166 | 1.0 .82 .72 .65 .59 .50 |
| | 167 | 4.10E6 5.05E6 |
| | 168 | 3.15E6 4.10E6 5.05E6 |
| | 169 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 170 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 171 | 2.52E6 3.15E6 |
| | 172 | 6.31E5 1.58E6 |
| | 173 | 5 13 49 0 6.1 4.7 1.0 6 |
| | 174 | .001 .007 .019 .037 .061 .099 |
| | 175 | .10 .40 .28 .12 .06 .04 |
| | 176 | 1.0 .82 .72 .65 .59 .50 |
| | 177 | 4.10E6 5.05E6 |
| | 178 | 3.15E6 4.10E6 5.05E6 |
| | 179 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 180 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 181 | 2.52E6 3.15E6 |
| | 182 | 6.31E5 1.58E6 |
| | 183 | 6 13 59 0 7.8 4.7 1.0 6 |
| | 184 | .001 .007 .019 .037 .061 .099 |
| | 185 | .10 .40 .28 .12 .06 .04 |
| | 186 | 1.0 .82 .72 .65 .59 .50 |
| | 187 | 4.10E6 5.05E6 |
| | 188 | 3.15E6 4.10E6 5.05E6 |
| | 189 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 190 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 191 | 2.52E6 3.15E6 |
| | 192 | 6.31E5 1.58E6 |
| | 193 | 7 13 69 0 9.6 4.7 1.0 6 |
| | 194 | .001 .007 .019 .037 .061 .099 |
| | 195 | .10 .40 .28 .12 .06 .04 |
| | 196 | 1.0 .82 .72 .65 .59 .50 |
| | 197 | 4.10E6 5.05E6 |
| | 198 | 3.15E6 4.10E6 5.05E6 |
| | 199 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 200 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 201 | 2.52E6 3.15E6 |
| | 202 | 6.31E5 1.58E6 |
| | 203 | 8 13 79 0 11.3 4.7 1.0 6 |
| | 204 | .001 .007 .019 .037 .061 .099 |
| | 205 | .10 .40 .28 .12 .06 .04 |
| | 206 | 1.0 .82 .72 .65 .59 .50 |
| | 207 | 4.10E6 5.05E6 |
| | 208 | 3.15E6 4.10E6 5.05E6 |
| | 209 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 210 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 211 | 2.52E6 3.15E6 |
| | 212 | 6.31E5 1.58E6 |
| | 213 | 9 13 89 0 13.0 4.7 1.0 6 |
| | 214 | .001 .007 .019 .037 .061 .099 |
| | 215 | .10 .40 .28 .12 .06 .04 |
| | 216 | 1.0 .82 .72 .65 .59 .50 |
| | 217 | 4.10E6 5.05E6 |
| | 218 | 3.15E6 4.10E6 5.05E6 |
| | 219 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 220 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 221 | 2.52E6 3.15E6 |

Figure D-3. (Continued)

| CARD GROUP | CARD NUMBER | CARD COLUMN |
|---|---|---|
| | 222 | 6.31E5 1.58E6 |
| | 223 | 10 13 99 0 14.8 4.7 1.0 6 |
| | 224 | .001 .007 .019 .037 .061 .099 |
| | 225 | .10 .40 .28 .12 .06 .04 |
| | 226 | 1.0 .82 .72 .65 .59 .50 |
| | 227 | 4.10E6 5.05E6 |
| | 228 | 3.15E6 4.10E6 5.05E6 |
| | 229 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 230 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 231 | 2.52E6 3.15E6 |
| | 232 | 6.31E5 1.58E6 |
| | 233 | 11 13 109 0 16.5 4.7 1.0 6 |
| | 234 | .001 .007 .019 .037 .061 .099 |
| | 235 | .10 .40 .28 .12 .06 .04 |
| | 236 | 1.0 .82 .72 .65 .59 .50 |
| | 237 | 4.10E6 5.05E6 |
| | 238 | 3.15E6 4.10E6 5.05E6 |
| | 239 | 2.52E6 3.78E6 4.42E6 5.05E6 5.99E6 6.94E6 |
| | 240 | 1.26E6 3.15E6 4.10E6 5.05E6 5.99E6 6.94E6 |
| | 241 | 2.52E6 3.15E6 |
| | 242 | 6.31E5 1.58E6 |

Figure D-3. (Continued)

Figure D-4. Total Annual Particulate Deposition Output Listing.



** ANNUAL GROUND LEVEL DEPOSITION ( GRAMS PER SQUARE METER ) FROM COMBINED SOURCES -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -
- DEPOSITION -

| Y AXIS (DISTANCE, METERS) | -3000.000 | -2000.000 | -1500.000 | -1250.000 | -1000.000 | -800.000 | -600.000 | -400.000 | -200.000 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.000 | 1.134221 | 1.639463 | 1.937078 | 2.107609 | 2.143732 | 2.184174 | 2.211250 | 2.214312 | 2.215422 |
| 2000.000 | 1.937597 | 2.587110 | 3.221557 | 3.601634 | 3.945059 | 4.133438 | 4.222740 | 4.266389 | 4.241170 |
| 1500.000 | 2.515018 | 3.859255 | 4.757793 | 5.265565 | 6.016244 | 6.548946 | 6.933612 | 7.159320 | 7.245927 |
| 1250.000 | 2.885484 | 4.750210 | 6.158155 | 7.051591 | 8.005323 | 9.200049 | 10.259617 | 10.953939 | 11.403341 |
| 1000.000 | 3.015925 | 5.790971 | 8.198109 | 9.824675 | 12.049610 | 13.835477 | 16.617570 | 19.191376 | 20.017103 |
| 800.000 | 3.118665 | 6.723281 | 10.227020 | 13.116776 | 17.001598 | 21.330920 | 25.851764 | 32.192329 | 35.950378 |
| 600.000 | 3.198263 | 7.139009 | 12.711740 | 17.176039 | 24.386861 | 33.110780 | 46.369599 | 59.624344 | 73.339372 |
| 400.000 | 3.231824 | 7.452122 | 13.763298 | 20.772664 | 34.658698 | 51.383995 | 81.345732 | 136.762327 | 191.922672 |
| 200.000 | 3.260319 | 7.604123 | 14.439153 | 22.418664 | 38.549571 | 67.598528 | 133.722347 | 291.315071 | 770.843849 |
| .000 | 3.295774 | 7.728414 | 14.785757 | 23.183982 | 40.974732 | 73.345537 | 154.204071 | 419.569622 | 1845.328690 |
| -200.000 | 3.021260 | 6.663865 | 12.083995 | 18.131350 | 29.459642 | 48.706669 | 86.985412 | 160.860039 | 538.879028 |
| -400.000 | 2.747118 | 5.751460 | 9.745962 | 13.718080 | 20.545333 | 29.059140 | 47.648258 | 97.087451 | 255.922882 |
| -600.000 | 2.474773 | 4.798650 | 7.463009 | 9.789230 | 14.324012 | 20.115365 | 32.932199 | 68.051999 | 140.046497 |
| -800.000 | 2.187730 | 3.831306 | 5.917305 | 7.848523 | 10.615602 | 15.115999 | 26.844012 | 46.936771 | 75.144969 |
| -1000.000 | 1.904801 | 3.277030 | 4.930394 | 6.180081 | 8.567480 | 13.443414 | 21.298683 | 34.190131 | 44.343476 |
| -1250.000 | 1.585251 | 2.782912 | 3.881238 | 4.961629 | 7.796925 | 11.327117 | 15.941791 | 21.839235 | 26.311772 |
| -1500.000 | 1.392180 | 2.339124 | 3.275689 | 4.708634 | 6.920204 | 9.234411 | 12.513065 | 15.002647 | 17.278957 |
| -2000.000 | 1.118999 | 1.719941 | 2.996098 | 3.945747 | 5.113114 | 6.347174 | 7.279683 | 8.167460 | 8.924505 |
| -3000.000 | .727015 | 1.483816 | 2.078208 | 2.481909 | 2.763994 | 2.990905 | 3.204907 | 3.388955 | 3.557447 |

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -
- DEPOSITION -

| Y AXIS (DISTANCE, METERS) | .000 | 200.000 | 400.000 | 600.000 | 800.000 | 1000.000 | 1250.000 | 1500.000 | 2000.000 |
|---|---|---|---|---|---|---|---|---|---|
| 3000.000 | 2.211638 | 2.047780 | 1.926208 | 1.805635 | 1.676092 | 1.546493 | 1.401486 | 1.236462 | .980173 |
| 2000.000 | 4.239700 | 3.769505 | 3.426651 | 3.068564 | 2.724039 | 2.427032 | 2.118193 | 1.817195 | 1.355867 |
| 1500.000 | 7.188654 | 6.142247 | 5.276752 | 4.428219 | 3.827579 | 3.370878 | 2.819301 | 2.468155 | 2.121625 |
| 1250.000 | 11.362197 | 9.374614 | 7.628834 | 6.045893 | 5.129163 | 4.268091 | 3.629981 | 3.317267 | 2.684304 |
| 1000.000 | 20.446176 | 15.862835 | 12.209504 | 9.346117 | 7.350258 | 6.192192 | 5.349532 | 4.620741 | 3.364506 |
| 800.000 | 37.232875 | 26.919234 | 18.648608 | 13.905805 | 10.931743 | 9.264294 | 7.477946 | 5.971407 | 4.298681 |
| 600.000 | 80.245540 | 50.712444 | 32.594069 | 23.934010 | 18.343005 | 14.069438 | 10.215782 | 8.380687 | 5.695859 |
| 400.000 | 227.641615 | 108.585946 | 70.870919 | 45.832468 | 30.395885 | 23.410457 | 16.581286 | 12.101673 | 7.181598 |
| 200.000 | 1099.698090 | 396.199959 | 168.505270 | 106.849947 | 62.288439 | 38.227509 | 23.876318 | 16.029036 | 8.652845 |
| .000 | 66.446947 | 2332.215515 | 562.934990 | 211.284319 | 101.501408 | 57.044015 | 32.068347 | 20.421163 | 10.279062 |
| -200.000 | 2150.378540 | 691.020302 | 312.472935 | 161.415503 | 84.747926 | 49.291997 | 29.021493 | 18.872555 | 9.701679 |
| -400.000 | 526.946770 | 197.174313 | 128.624983 | 85.196825 | 57.083517 | 40.271049 | 25.078926 | 16.940746 | 9.064738 |
| -600.000 | 199.108976 | 108.586233 | 60.900404 | 44.144599 | 34.178925 | 26.272262 | 19.202941 | 14.666088 | 8.252060 |
| -800.000 | 96.021443 | 62.343819 | 35.959193 | 26.243457 | 20.353180 | 17.269755 | 14.025793 | 11.155712 | 7.359030 |
| -1000.000 | 54.079618 | 38.520713 | 25.256704 | 18.061436 | 13.948326 | 11.551953 | 9.969604 | 8.535183 | 6.043626 |
| -1250.000 | 30.300152 | 23.453363 | 17.121252 | 12.005635 | 9.963830 | 8.086905 | 6.614571 | 5.967364 | 4.732408 |
| -1500.000 | 19.362919 | 15.695401 | 12.317631 | 9.088348 | 7.326366 | 6.250738 | 5.024605 | 4.272190 | 3.646432 |
| -2000.000 | 9.675628 | 8.328359 | 7.153207 | 5.894278 | 4.709229 | 4.018550 | 3.459508 | 2.932448 | 2.156350 |
| -3000.000 | 3.739484 | 3.416272 | 3.135168 | 2.851264 | 2.550874 | 2.251947 | 1.914329 | 1.689826 | 1.357427 |

Figure D-4. (Continued).

**** ISCLT ************** HYPOTHETICAL POTASH PROCESSING PLANT ********* PAGE 60 ****

** ANNUAL GROUND LEVEL DEPOSITION ( GRAMS PER SQUARE METER ) (CONT.) FROM COMBINED SOURCES -11,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

| Y AXIS (DISTANCE 3000.000 , METERS ) | - DEPOSITION - |
|---|---|
| 3000.000 | .597871 |
| 2000.000 | 1.065438 |
| 1500.000 | 1.420439 |
| 1250.000 | 1.684143 |
| 1000.000 | 2.126221 |
| 800.000 | 2.510407 |
| 600.000 | 2.904970 |
| 400.000 | 3.291805 |
| 200.000 | 3.676092 |
| .000 | 4.070621 |
| -200.000 | 3.910680 |
| -400.000 | 3.751918 |
| -600.000 | 3.571520 |
| -800.000 | 3.356034 |
| -1000.000 | 3.123007 |
| -1250.000 | 2.833049 |
| -1500.000 | 2.389837 |
| -2000.000 | 1.725906 |
| -3000.000 | .865388 |

- DISCRETE RECEPTORS -

| X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | DEPOSITION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | DEPOSITION | X RANGE (METERS) | Y AZIMUTH BEARING (DEGREES) | DEPOSITION |
|---|---|---|---|---|---|---|---|---|
| 2108.0 | 14.0 | 3.144266 | | | | | | |

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | DEPOSITION |
|---|---|---|
| 200.00 | .00 | 2332.215515 |
| .00 | -200.00 | 2150.373540 |
| -200.00 | .00 | 1845.328690 |
| .00 | 200.00 | 1099.693090 |
| -200.00 | 200.00 | 770.843849 |
| 200.00 | -200.00 | 691.020302 |
| 400.00 | .00 | 562.934990 |
| -200.00 | -200.00 | 538.879028 |
| .00 | -400.00 | 526.946770 |

Figure D-4. (Continued).

**** ISCLT ********** HYPOTHETICAL POTASH PROCESSING PLANT ******** PAGE 61 ****

** ANNUAL GROUND LEVEL DEPOSITION ( GRAMS PER SQUARE METER ) (CONT.) FROM COMBINED SOURCES -11,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

| X COORDINATE (METERS) | Y COORDINATE (METERS ) | DEPOSITION |
|---|---|---|
| -400.00 | .00 | 419.569622 |

APPENDIX E

LOGIC FLOW DESCRIPTION OF THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

The ISCST program is composed of a main program (ISCST), eighteen subroutines (INCHK, MODEL, DYOUT, MAXOT, MAX50, VERT, VRTRHT, SIGMAZ, URBNYZ, XVY, XVZ, URBBAR, NMCALM, AVCALM, MPR1, BLP, CUBIC, AND ERFX) and a BLOCK DATA subprogram (BLOCK). The source codes for all of these routines are listed in Appendix A and Figure E-1 shows the subroutine calling sequence.

The main routine (ISCST) of the program is responsible for clearing (setting all values to zero) all data storage, reading the necessary input parameters in order to compute the required data storage* for a problem run and printing an error message if the computed data storage exceeds the allocated data storage. Assuming that no error is found in computing the required data storage, this routine calls subroutine INCHK which reads the remaining input parameters (except for the hourly meteorological data), provides program default values when necessary and prints all input parameters when desired by the user. Finally, the main routine, upon a return from subroutine INCHK, calls subroutine MODEL which reads the hourly meteorological data, performs all concentration or deposition calculations and controls all output. A successful return from subroutine MODEL allows the main program to normally terminate the run.

Subroutine INCHK reads receptor location data, source group data, meteorological-related constants data, identification labels, model constants, and source data. Default values are provided by the program for all input parameters when necessary. This subroutine will print error messages and

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*Consult Section 3.2.3.a for a discussion of required data storage computations.

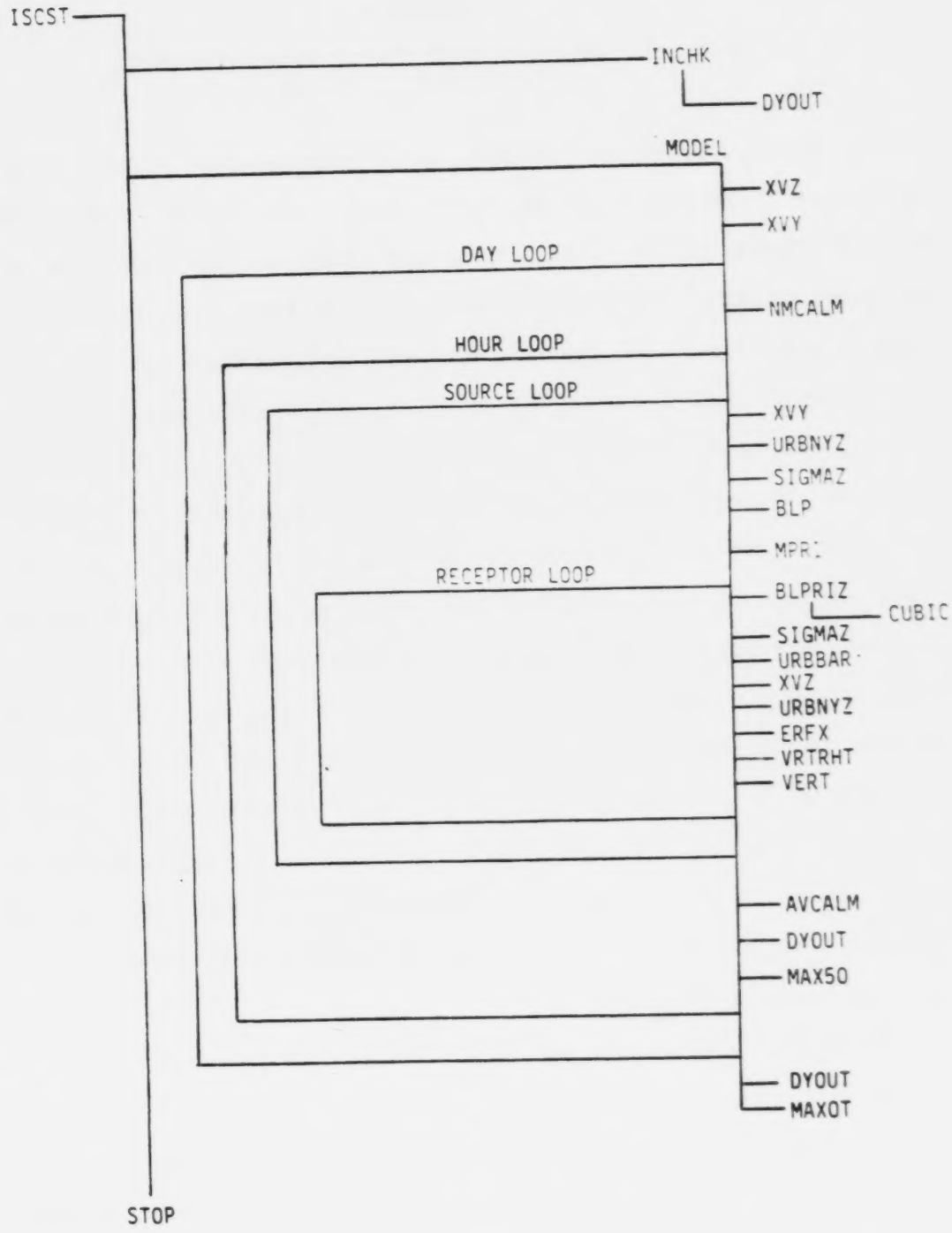



Figure E-1. ISCST Structure and Subroutines

terminate the run when the number of sources to be processed equals zero and when either the values of the surface or upper air station number and years specified by the user do not match the corresponding information read from the hourly meteorological data tape. This subroutine will then print all input data parameters if desired by the user. The INCHK subroutine then returns to the calling routine (ISCST) provided no errors were detected.

Subroutine MODEL is the principal section of the ISCST program. Its main functions are reading the hourly meteorological data, performing all concentration or deposition calculations and controlling the output related to calculated concentration or deposition values. First, if Urban Mode 3 is selected, subroutines XVY and XVZ are called to compute lateral ($X_y$) and vertical ($X_z$) virtual distances, respectively for all source, stability category, and downwind distance combinations. If Urban Mode 3 is not selected $X_y$ and $X_z$ are computed later in subroutine MODEL. Next, the subroutine searches for all source-receptor distances less than one meter or the greater of three building heights or three building widths. A diagnostic table identifying the aforementioned source-receptor combinations is printed. The subroutine then begins a loop over all days of meteorological data and reads a day of data from either tape or card. A second loop is begun over the hours of meteorological data followed by a third loop over all sources. For stack-type sources, subroutine MPR1 is called to calculate plume rise independent of source-receptor orientation when the original ISC downwash treatment method is selected. If the Schulman-Scire downwash treatment method is selected and all the criteria are met, subroutine BLP is called to determine plume rise and later entered at BLPRIZ to solve for a cubic equation by calling subroutine CUBIC. Next, a loop over all receptors is begun. In this portion of the subroutine, all information has been collected in order to calculate the terms used to make a concentration or deposition computation at a given receptor from a given source for an hour of meteorological data. The

program first computes the downwind (x) and crosswind (y) distances. For stack-type sources, the subroutine then completes the remaining plume rise calculations if they are dependent on source-receptor orientation. Next, if Urban Mode 3 is selected, subroutine URBBAR is called to calculate the downwind distance index and $\bar{b}$ (if deposition is considered). Then subroutine URBNYZ is called to calculate the lateral ($\sigma_y$) and vertical ($\sigma_z$) dispersion coefficients as a function of downwind distance and stability category. If Urban Mode 3 is not selected, subroutine SIGMAZ is called to compute the downwind distance index, $\sigma_z$, and $\bar{b}$ (if deposition is considered), and $\sigma_y$ is computed in the subroutine MODEL. Finally, concentration or deposition is calculated for this source-receptor combination for a given hour of meteorological data. Subroutine ERFX is called to compute the error function values for area-type sources. Subroutine VERT aids in calculating the Vertical Term for calculations of concentration or deposition requiring a Vertical Term value for receptors located at ground level. If concentration calculations of receptors located above ground are desired, subroutine VRTHT is used. As the subroutine loops over all receptors, the calculated concentration or deposition values are stored into an array (CALC). After all receptors are processed for this source and hour, the array of values (CALC) are stored or summed into portions of another array (CHIAV) depending on source group combinations desired by the user. After all sources are processed for a given hour, portions of the CHIAV array are stored or summed into other arrays depending on the source group combination. For each hour and appropriate combination of user-defined time intervals, the subroutine calculates averages (for concentration) or sum totals (for deposition) of values in portions of the CHIAV array. Portions of array CHIAV are then used by the subroutine DYOUT to print tables, write to the output tape, store for "N"-day summations, search for highest and second-highest

values at each receptor and search for the maximum 50 calculated values. After looping over all hours and days of meteorological data, MODEL calls subroutine DYOUT to optionally print tables or write to tape "N"-day average concentration or total deposition values and tables of the highest and second-highest average concentration or total deposition. Subroutine MAXOT is called to optionally print tables of the maximum 50 average concentration or total deposition values. Upon normal processing of MODEL, a return is made to the ISCST routine.

Subroutine DYOUT prints out different types of tables related to all receptor points. Depending on a flag variable, subroutine DYOUT prints the terrain elevations or receptor heights for all receptors, the average concentration or total deposition values for all receptors for a given time interval and source group combination for a given day, and the highest or second-highest average concentration or total deposition values for all receptors for a given time interval and source group combination.

The remaining subroutines which make up the ISCST program have the following functions. Subroutine MAXOT lists the maximum 50 average concentration or total deposition values calculated for the problem. Subroutine MAX50 searches for and stores the maximum 50 average concentration or total deposition values for a given time interval and source group combination. Subroutine VERT aids in computing the Vertical Term when required in calculating concentration or deposition at ground level. Subroutine VRTRHT aids in computing the Vertical Term when required in calculating concentrations at receptors above ground level. Subroutine SIGMAZ is called only if Urban Mode 3 is not selected, and has three functions. Depending on a flag variable, this subroutine computes a downwind distance index used for accessing arrays containing virtual distances or arrays of constants related to calculating the vertical ($\sigma_z$) and horizontal ($\sigma_y$) dispersion coefficients. The second function is to calculate $\sigma_z$. The

last function is to compute the average exponent ($\bar{b}$), for the interval between the source and the downwind distance (x), which is used for deposition calculations. Subroutine URBNYZ uses the (Briggs, 1974) curves of urban dispersion coefficients derived from the (McElroy-Pooler, 1968) dispersion rates to compute the lateral ($\sigma_y$) and vertical ($\sigma_z$) virtual distances as a function of downwind distance and stability category. This subroutine is only called when Urban Mode 3 is selected. Subroutines XVY and XVZ compute lateral ($X_y$) and vertical ($X_z$) virtual distances, respectively, for all source, stability category, and downwind distance categories. Similarly, these functions are only called if Urban Mode 3 is selected. Subroutine URBBAR is also called only when Urban Mode 3 is selected. Depending on a flag variable this routine calculates either the downwind distance index used in the $\sigma_z$ and $\sigma_y$ computations, or the average exponent ($\bar{b}$) used for deposition calculations. Subroutine NMCALM determines the number of calm hours for each averaging period per day. This subroutine is called only if the user desires calm wind processing. Subroutine AVCALM is used in conjunction with subroutine NMCALM to determine the divisor used for averaging concentration or deposition results for averaging periods which had calm hours. Subroutine MPR1 calculates plume rise independent of source-receptor orientation, in a manner consistent with the MPTER model when the original ISC downwash treatment method is selected or when the Schulman-Scire downwash criteria are not met. Subroutine BLP calculates plume rise as in the BLP model. Subroutine CUBIC is called from BLPRIZ (an entry of BLP) to solve for one root of the cubic equation. These two subroutines are used only when the Schulman-Scire downwash treatment method is selected and all the criteria is met. (See Section 2.4.1.1d of Volume I). Function ERFX computes the value of the error function terms for area-type sources.

# APPENDIX F

## LOGIC FLOW DESCRIPTION OF THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

The ISCLT computer program consists of a main program (ISCLT) and 22 subroutines (MODEL, OUTPT, HEADNG, MXIMUM, CHECKR, SUMMER, TITLR, DISTR, FUNCT, VERTC1, VRTC1R, VERTC2, VERTC3, SIGMAZ, VIRTZ, VIRTY, URBNYZ, XVY, XVZ, MPR1LT, BLPLT, AND CUBIC.) The FORTRAN source code of these routines is given in Appendix B and the subroutine calling sequence is shown in Figure F-1.

The main routine (ISCLT) of the program is responsible for initializing the program and starting the input data read sequence. This routine reads the problem run title, the program options data and those variables that specify the size (number of values) of required data parameter arrays. The primary function of this routine is to calculate the amount of storage required by the input receptor arrays, elevation array, receptor height array and the concentration or deposition calculation arrays. The program has been designed to store these data in 40,000 words in BLANK COMMON. The program calculates the starting location of each array and passes this information to the main calculation routine (MODEL). The program may use all or part of BLANK COMMON depending on the program options selected. The amount of BLANK COMMON required for a given problem run is calculated by Equation (3-1) in Section 3.2.3.

Subroutine MODEL is the principal processing routine of the ISCLT program. This routine reads the receptor elevation, receptor height and meteorological data from input card images or from magnetic tape. The program provides default data values for some variables and begins a loop over all input sources. If a source is a new source from data card, concentration or deposition is calculated using the long-term model equations. If a source is a previous source from an input tape, its concentration or deposition arrays

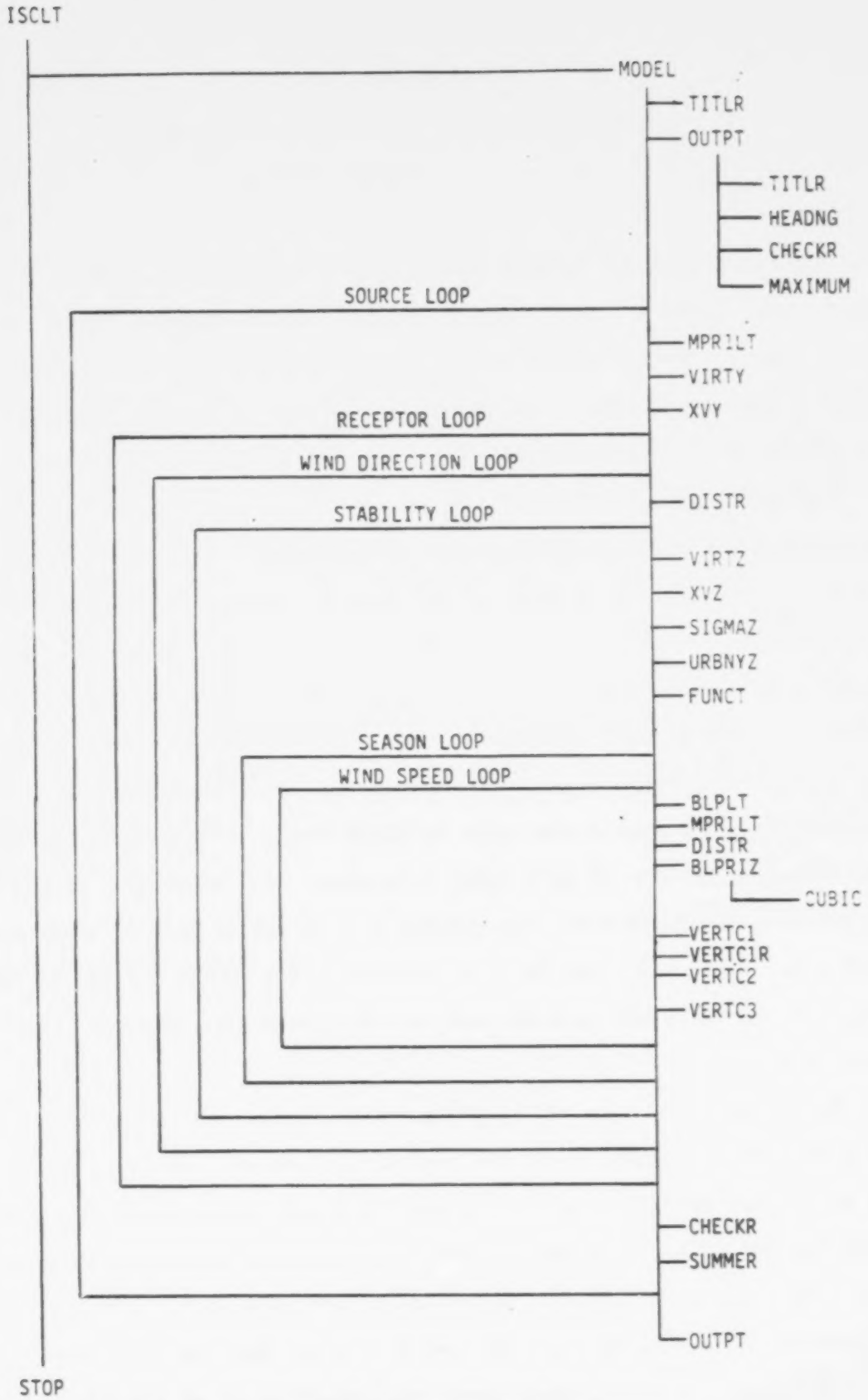



Figure F-1. ISCLT Structure and Subroutines

are read from tape. New and/or previous sources and their respective concentration or deposition arrays are merged into a source/concentration (deposition) inventory of one or more sources for which seasonal and/or annual concentration or deposition values for the individual as well as the combined sources can be output. This routine will also, on option, output all of the program input data including options, receptor arrays, meteorological data, source data and the calculated seasonal concentration or deposition values to tape to be held as a historical file which may be used at a later date to update or to retrieve information not printed when the tape was generated.

Subroutine OUTPT controls the printing of the input source data if this option is chosen. This subroutine also controls the printing of the results of all concentration or deposition calculations and controls the calculations of the maximum 10 concentration or deposition values.

Subroutine HEADNG prints the table headings for the concentration or deposition tables. The headings identify whether seasonal or annual calculations are being printed, whether they are for individual or combined sources and, if combined, which sources are used in the combination. All program output tables are labeled either seasonal or annual. If the user is using monthly data, he/she must remember that season one is actually month one, etc. and an annual label would actually be average monthly or seasonal.

Subroutine TITLR controls the starting of a new output page and writes the problem run title information and page number as the first line of each output page. Also, this subroutine writes the main heading of the input data tables.

Subroutine SUMMER is called by MODEL to sum arrays of concentration or deposition to provide annual (averaged or total) output and to provide combined source output.

Subroutine CHECKR is called by MODEL to determine if a source is part of the current combined sources being summed or if the source is part of any

source combination so the program can decide whether to save it or not when all source calculations are being saved in storage.

Subroutine MXIMUM is called by OUTPT and determines the maximum 10 concentration or deposition values and their respective receptor coordinates for a source or source combination and returns them to subroutine OUTPT.

Function VIRTZ is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected. The routine calculates and returns the vertical virtual distance $X_z$ using the Pasquill-Gifford dispersion curves (Turner, 1970).

Function VIRTY is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected. The routine calculates the lateral virtual distance $X_y$ using the Pasquill-Gifford dispersion curves (Turner, 1970).

Function XVZ is called by MODEL when Urban Mode 3 is selected and calculates the vertical virtual distance $X_z$ using the (Briggs, 1974) urban dispersion coefficients.

Function XVY is called by MODEL when Urban Mode 3 is selected and calculates the lateral virtual distance $X_y$ using the (Briggs, 1974) urban dispersion coefficients.

Function SIGMAZ is called by MODEL when the Rural Mode or Urban Mode 1 or 2 is selected and calculates the standard deviation of the vertical concentration distribution $\sigma_z$. The routine uses the Pasquill-Gifford dispersion curves (Turner, 1970).

Subroutine URBNYZ is called by MODEL when Urban Mode 3 is selected and calculates and returns the standard deviation of the vertical concentration distribution $\sigma_z$. This routine uses the (Briggs, 1974) coefficients determined from the (McElroy-Pooler, 1968) rates.

Subroutine MPRILT is called by MODEL for stack sources when the original ISC downwash treatment method is selected or when the Schulman-Scire downwash

criteria is not met and calculates the plume rise independent of source-receptor orientation. The algorithm is consistent with the MPTER model.

Subroutine BLPLT is called by MODEL for stack sources when the Schulman-Scire downwash treatment method is selected and all criteria are met. (See Section 2.4.1.1.d of Volume I).

Subroutine VERTC1 is called by MODEL and calculates and returns the Vertical Term of the concentration equation for receptors located at ground level.

Subroutine VRTC1R is called by MODEL and calculates and returns the Vertical Term of the concentration equation for receptors located above ground level.

Subroutine VERTC2 is called by MODEL and calculates and returns the Vertical Term for each particulate size category in the calculation of concentration with deposition occurring.

Subroutine VERTC3 is called by MODEL and calculates and returns the Vertical Term for each particulate size category used in the deposition equation.

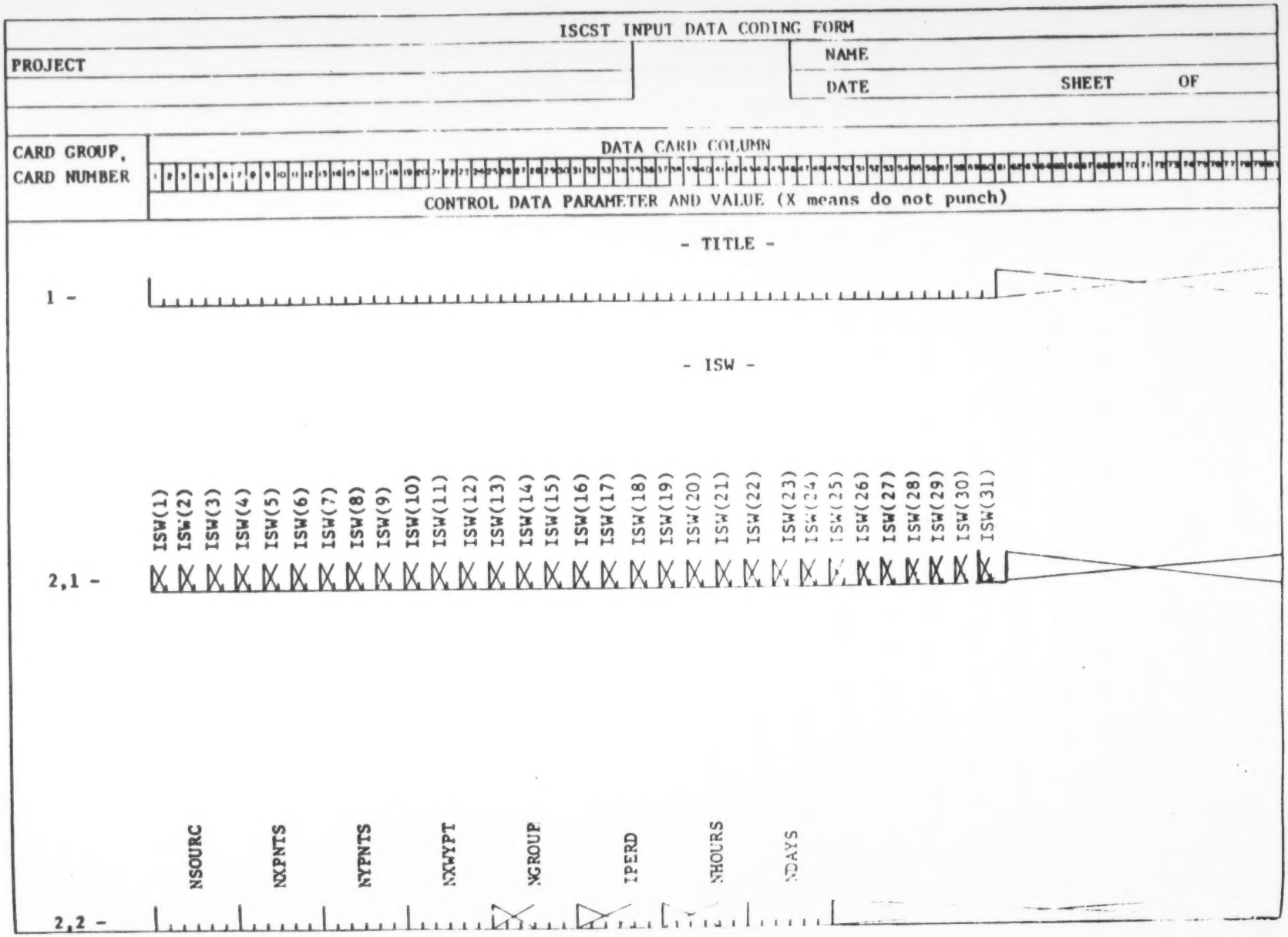
Function FUNCT is called by MODEL and calculates and returns the average value $\bar{b}$ of the coefficient b which is the exponent used in the $\sigma_z$ equation. This value is used in the deposition calculations.

Subroutine DISTR is called by MODEL and calculates and returns the distance between the source and receptor if the receptor is within the required calculation sector and calculates the smoothing term $S\{\theta\}$ of the concentration or deposition equation. Subroutine DISTR returns $S\{\theta\}r\Delta\theta$ or returns a "-1" if the receptor point is outside of the calculation sector downwind of the source.

# APPENDIX G

## CODING FORMS FOR CARD INPUT TO THE ISC SHORT-TERM MODEL (ISCST) COMPUTER PROGRAM

This appendix contains blank coding forms used for entering input card data for the ISC short-term (ISCST) program. The card group numbers and input data parameter names correspond to those used in Section 3.2.3.a. The solid vertical lines on the coding forms define the column fields for a particular input parameter and the "x"ed areas indicate where data are ignored by the program. The coding forms are presented in the same order as the program expects the input data except for the source data coding forms. The program expects card numbers 2 through 4 to immediately follow card number 1 of Card Group 6 when applicable (NVS is greater than zero). However, it is much easier to enter the source data as presented here.


ISCST INPUT DATA CODING FORM
PROJECT
NAME
DATE
SHEET
OF
CARD GROUP, CARD NUMBER
DATA CARD COLUMN
CONTROL DATA PARAMETER AND VALUE (X means do not punch)
- TITLE -
1 -
- ISW -
ISW(1) ISW(2) ISW(3) ISW(4) ISW(5) ISW(6) ISW(7) ISW(8) ISW(9) ISW(10) ISW(11) ISW(12) ISW(13) ISW(14) ISW(15) ISW(16) ISW(17) ISW(18) ISW(19) ISW(20) ISW(21) ISW(22) ISW(23) ISW(24) ISW(25) ISW(26) ISW(27) ISW(28) ISW(29) ISW(30) ISW(31)
2,1 -
NSOURC NXPNTS NYPNTS NXWYPT NGROUP IPERD NHOURS NDAYS
2,2 -

ISCST INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

RECEPTOR DATA PARAMETER AND VALUE

- GRIDX (axis of grid system, omit if NXPNTS OR NYPNTS = 0) -

3,1 -

- GRIDY (axis of grid system, omit if NXPNTS or NYPNTS = 0) -

3,2 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

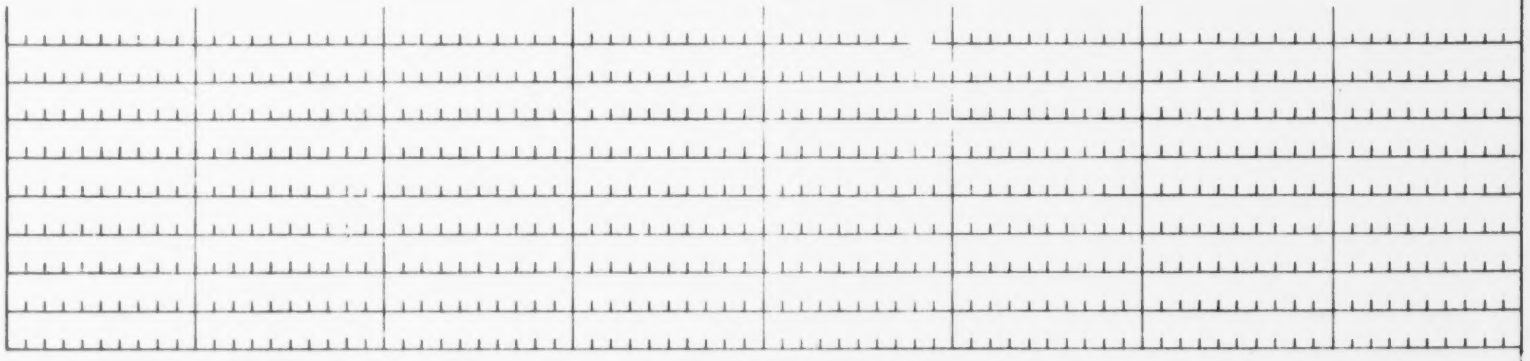
DATE

SHEET OF

| CARD GROUP, CARD NUMBER | DATA CARD COLUMN<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80<br>RECEPTOR DATA PARAMETER AND VALUE |
|---|---|

- GRIDZ (grid system receptor elevations, omit if ISW(4) = 0) -

3,3 -



3,4 - - XDIS, YDIS, GRIDZ (discrete receptors, omit if NXWYPTS = 0) -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

RECEPTOR DATA PARAMETER AND VALUE

3,4 - - XDIS, YDIS, GRIDZ, RHT (discrete receptors, omit if NXWYPTS = 0) -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

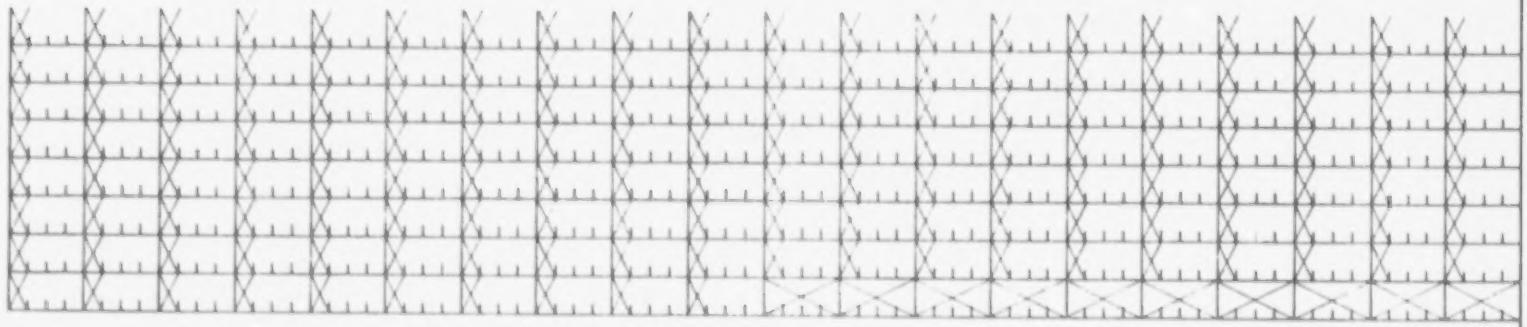
CARD GROUP, CARD NAME

DATA CARD COLUMN

SOURCE GROUP DATA PARAMETER AND VALUE (X means do not punch)

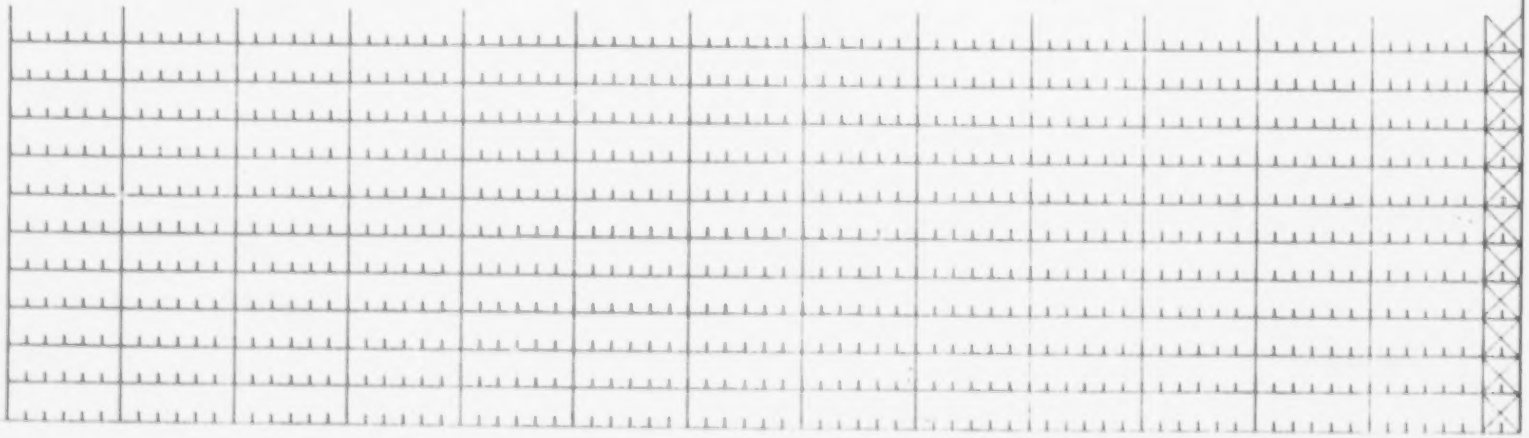
- NSOGRP (array, omit if NGROUP = 0) -

4,1 -



- IDSOR (array, omit if NGROUP = 0) -

4,2 -



ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

METEOROLOGICAL CONSTANTS DATA PARAMETER AND VALUE (X means do not punch)

- PDEF (array, omit if ISW(21) ≠ 2 or ISW(28) = 1) -

5,1-6 -

- DTHDEF (array, omit if ISW(22) ≠ 2 or ISW(28) = 1) -

5,7-12 -

ZR - UCATS (array) -

5,13 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

DATA CARD COLUMN

CARD GROUP, CARD NUMBER

METEOROLOGICAL CONSTANTS AND IDENTIFICATION LABEL DATA PARAMETER AND VALUE (X means do not punch)

5,14 - TK BETA1 BETA2 DECAY IQUN ICHIUN IMET ITAP

- IDAY (array, omit if ISW(19) = 2) -

5,15-19 -

- (omit if ISW(19) = 2) -

5,20 - ISS ISY IUS IUY

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

6,1 -

| NSO | ITYPE WAKE NVS | QFLG | Q | XS | YS | ZS | HS | TS | VS | D | HB | HL | HW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

- PHI (array, omit if NVS = 0 for all sources) -

6,2 -

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP, CARD NUMBER | DATA CARD COLUMN<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80<br>SOURCE DATA PARAMETER AND VALUE |
|---|---|
| 6,3 - | - VSN (array, omit if NVS = 0 for all sources) - |

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP, CARD NUMBER | DATA CARD COLUMN<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80<br>SOURCE DATA PARAMETER AND VALUE |
|---|---|
| 6,4 - | - GAMMA (array, omit if NVS = 0 for all sources) - |

ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

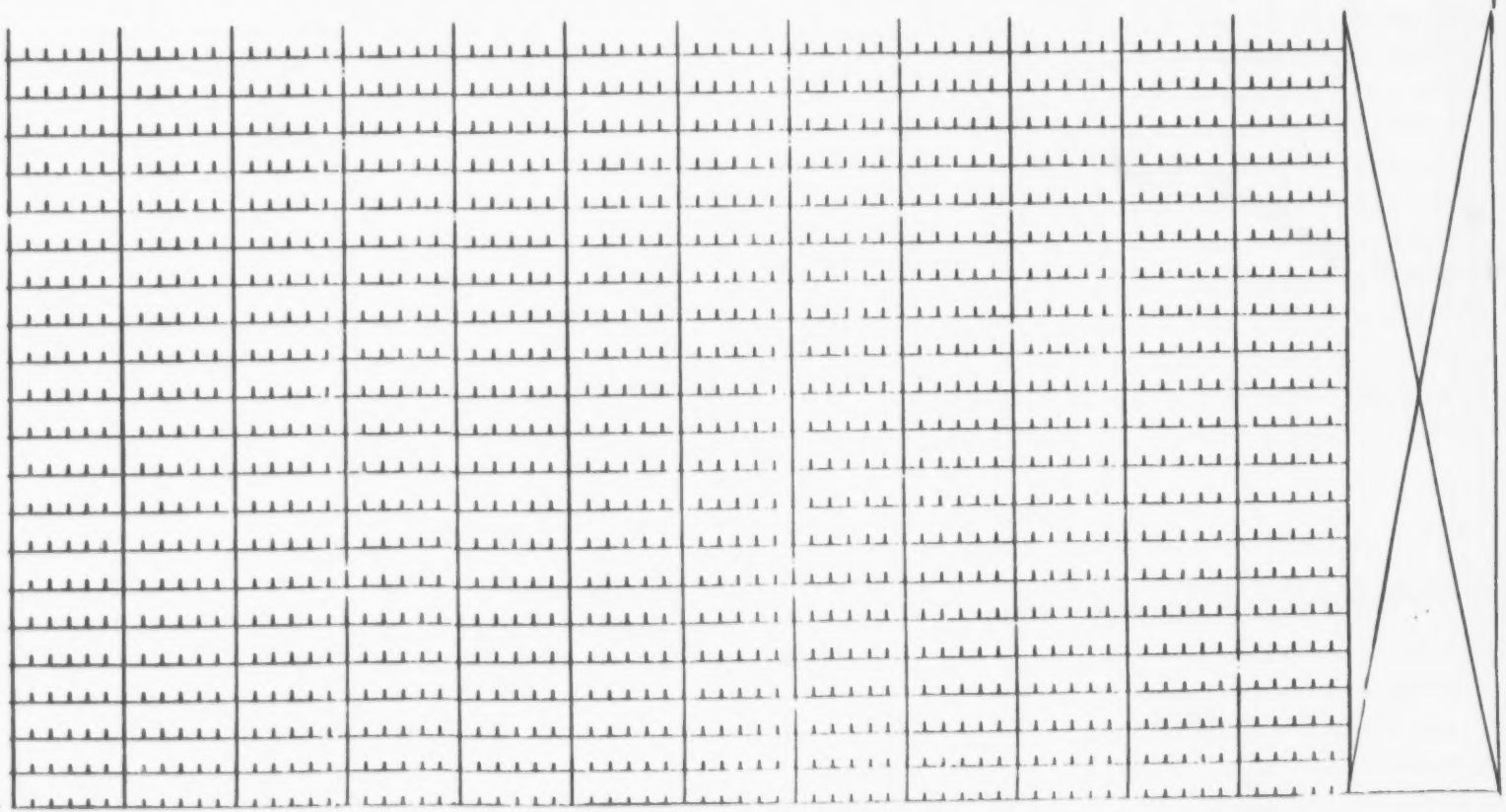
CARD GROUP, CARD NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

- BH (if ISW(28) = 1 or HB<0,
and if HS $\leq$ HB + 0.5 * MIN(HB,1.13 * SQRT(HW*HL))) -

6, 4a -



ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP, CARD NUMBER

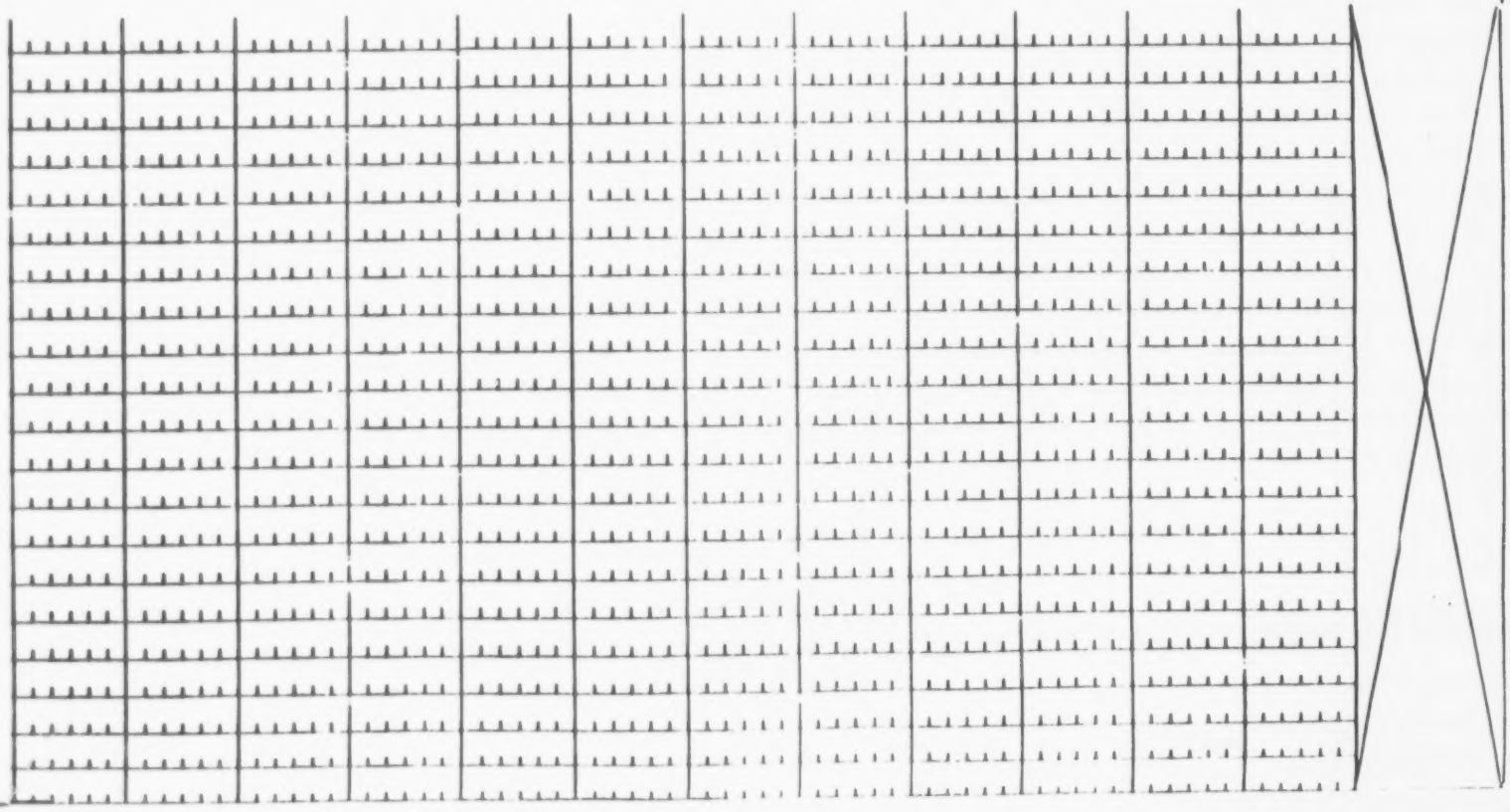
DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

- BW (if ISW(28) = 1 or HB<0,

and if HS < HB + 0.5 * MIN(HB,1.13 * SQRT(HW*HL))) -

6,4b -



ISCST INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP, CARD NUMBER | DATA CARD COLUMN |
|---|---|
| | SOURCE DATA PARAMETER AND VALUE |

- QTK (array, omit if ISW(23) = 0 and QFLG = 0 for all sources) -

6,5 -

## ISCST INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

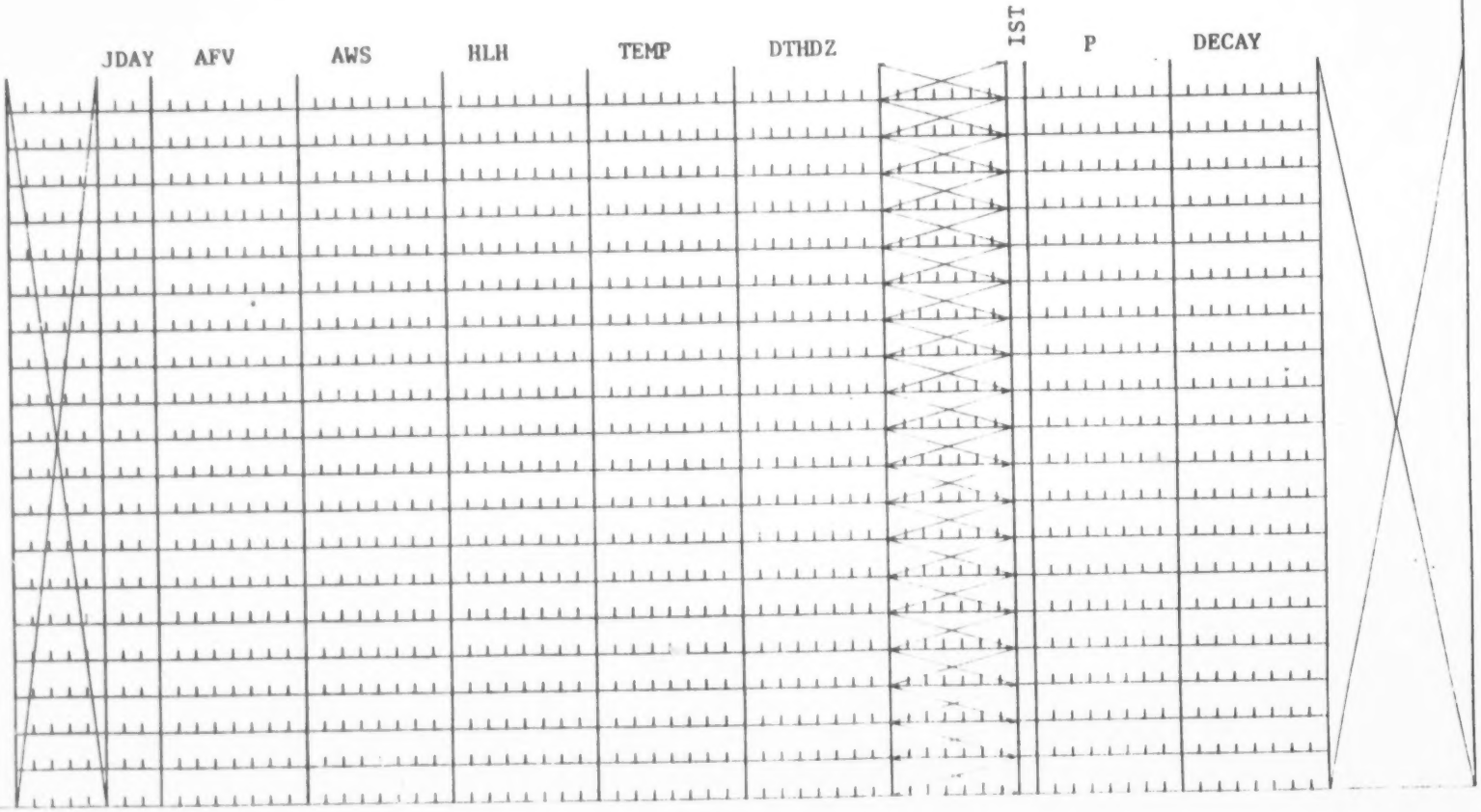
CARD GROUP, CARD NUMBER

DATA CARD COLUMN

HOURLY METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

- (omit if ISW(19) = 1) -

7,1 -



APPENDIX H

# CODING FORMS FOR CARD INPUT TO THE ISC LONG-TERM MODEL (ISCLT) COMPUTER PROGRAM

The coding forms shown in this appendix are used to prepare the input data for the ISCLT program for card punching. If any input card has all zero values, it may be left blank because the program interprets blanks as zero. The coding forms are presented in the same order as the program expects the input data except for the source input coding forms. The source input coding forms show a form for Card Groups 17, 17a, 17b, 17c and 17d individually. This is done to make the key punching of the source data easier and to minimize the number of coding forms that must be filled out. When the source card data have been punched, the user must reorder the source input cards in sets from Card Groups 17 through 17d, one set for each successive source.

ISCLT INPUT DATA CODING FORM

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

CONTROL DATA PARAMETER AND VALUE (X means do not punch)

- TITLE -

1 -

- ISW -

ISW(1) ISW(2) ISW(3) ISW(4) ISW(5) ISW(6) ISW(7) ISW(8) ISW(9) ISW(10) ISW(11) ISW(12) ISW(13) ISW(14) ISW(15) ISW(16) ISW(17) ISW(18) ISW(19) ISW(20) ISW(21) ISW(22) ISW(23) ISW(24) ISW(25)

2 -

NSOURC NGROUP NXPNTS NYPNTS NXWYPT NSEASN NSPEED NSTBLE NSCTOR NOFILE

3 -

- NØCØMB (array, omit if NGRØUP=0) -

4 -

- IDSØRC (array, omit if NGROUP=0) -

4a -

- UNITS (omit if ISW(5) = 2 or 3)

5 -

ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | RECEPTOR DATA PARAMETER AND VALUE (X means do not punch) |

- X (axis of grid system, omit if NXPNTS = 0 or ISW(5) = 2 or 3) -

6 -

ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | RECEPTOR DATA PARAMETER AND VALUE (X means do not punch) |

- Y (axis of grid system, omit if NYPNTS = 0 or ISW(5) = 2 or 3) -

7 -

ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | RECEPTOR DATA PARAMETER AND VALUE (X means do not punch) |

- Z (grid system elevations, omit if ISW(1) = 0 or ISW(5) = 2 or 3 or NXPNTS = 0) -

8 -

## ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP NUMBER | DATA CARD COLUMN<br>SOURCE PARAMETER AND VALUE |
|---|---|
| 8b- | - RHT (grid receptor heights above ground, omit if ISW(25) = 0) - |

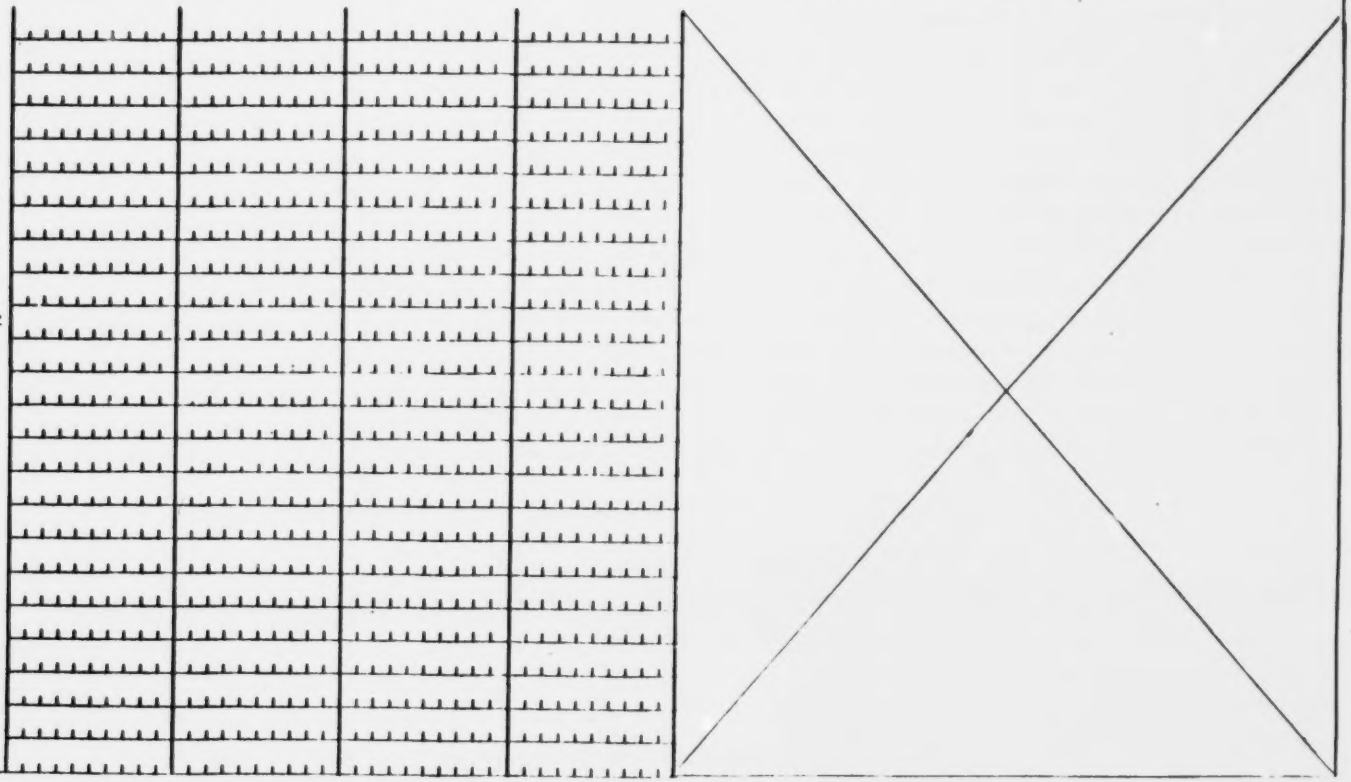
ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | RECEPTOR DATA PARAMETER AND VALUE ( ⟨ means do not punch) |
|---|---|

- X, Y, Z, RHT (arbitrarily spaced receptors, omit if NXWYPT = 0, ISW(5) = 2 or 3 and ISW(12) = 0 -

6a, 7a, 8a, 8c



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

METEORLOGICAL DATA PARAMETER AND VALUE (X means do not punch)

9 - - FMT (omit if ISW(5) = 2 or 3 or ISW(18) = 0) -

- FREQ (omit if ISW(5) = 2 or 3 -

9a -

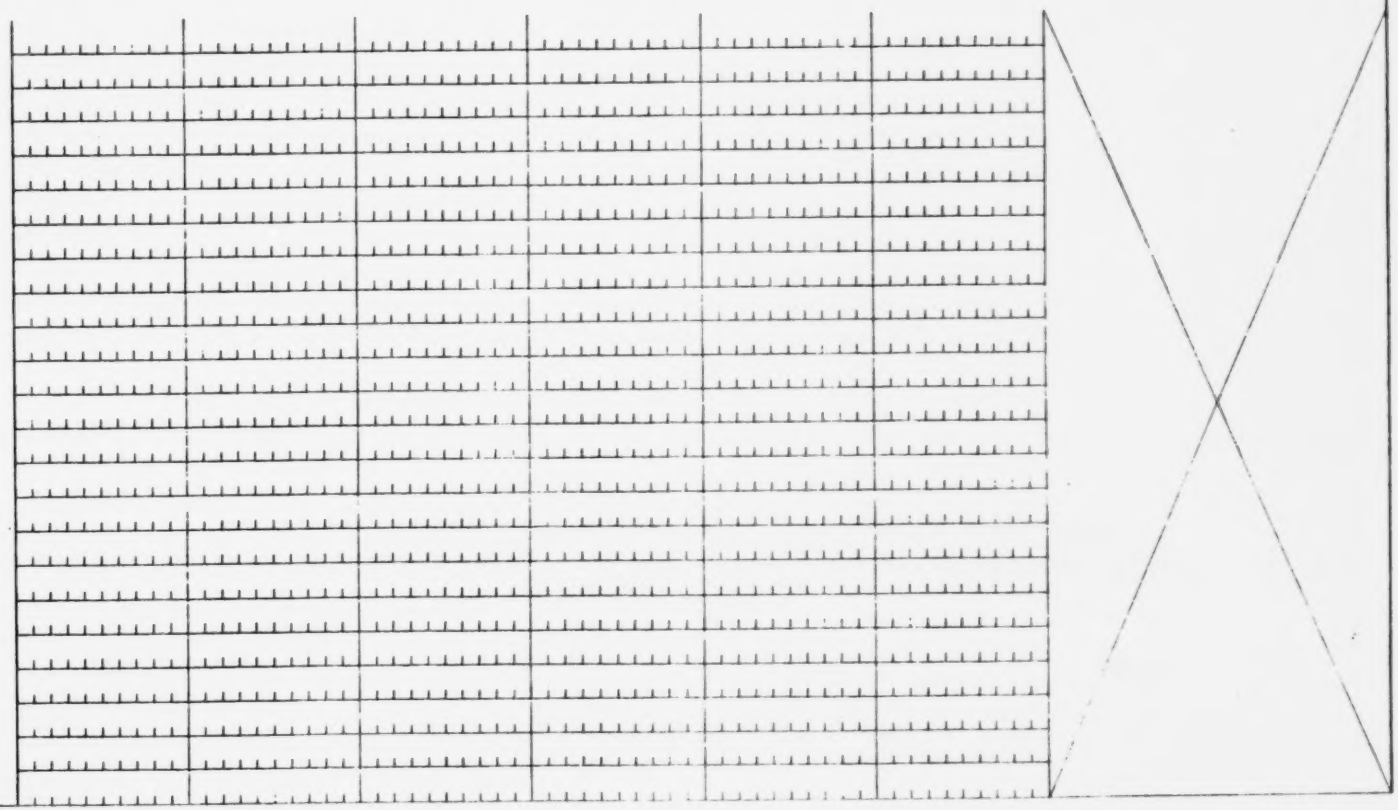
ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | METEOROLOGICAL DATA PARAMETER AND VALUE ( means do not punch) |

- FREQ (Continued) -

9a - (Cont.)



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

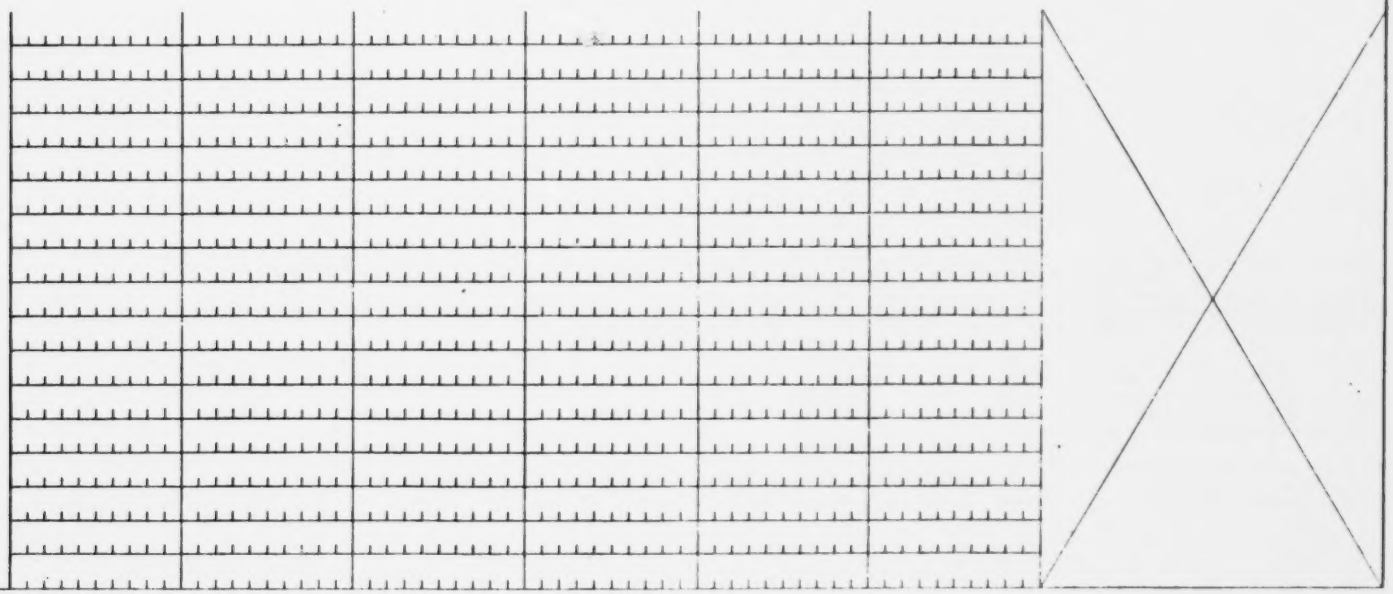
| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 |
| | METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch) |

- TA (omit if ISW(5) = 2 or 3) -

10 -

- HM (omit if ISW(5) = 2 or 3) -

11 -



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

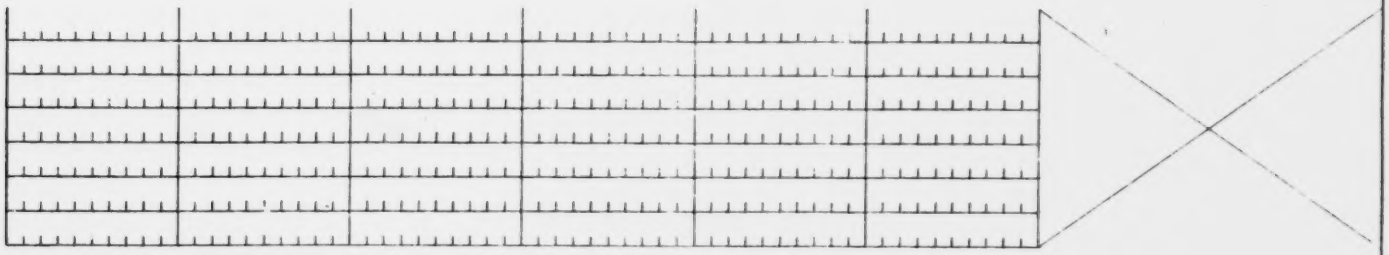
CARD GROUP NUMBER

DATA CARD COLUMN

METEOROLOGICAL DATA PARAMETER AND VALUE ( means do not punch)

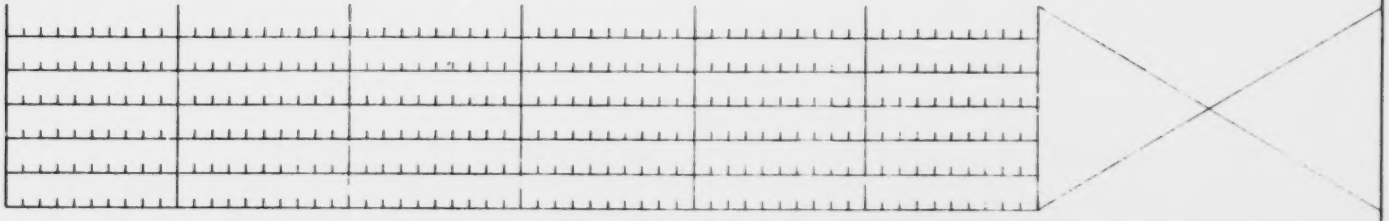
- HM (Continued) -

11 - (Cont.)



- DPDZ (omit if ISW(5) = 2 or 3) -

12 -

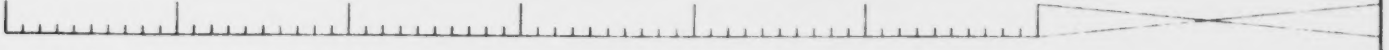


- (omit if ISW(5) = 2 or 3) -

13 - ROTATE TK ZR BETA1 BETA2 G DECAY

- UBAR (omit if ISW(5) = 2 or 3) -

14 -



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 |
| | METEOROLOGICAL DATA PARAMETER AND VALUE (X means do not punch) |

- PHI (omit if ISW(5) = 2 or 3) -

15 -

- P (omit if ISW(5) = 2 or 3) -

16 -

ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

CARD GROUP NUMBER | DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

| 17 - | NUMS | DISP TYPE QFLG | DX | DY | H | ZS | TS or SIGYO or XO | VEL or SIGZO | D | HB | BW | WAKE NVS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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## ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | SOURCE PARAMETER AND VALUE |

- VS (omit if NVS = 0) -

17a -

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

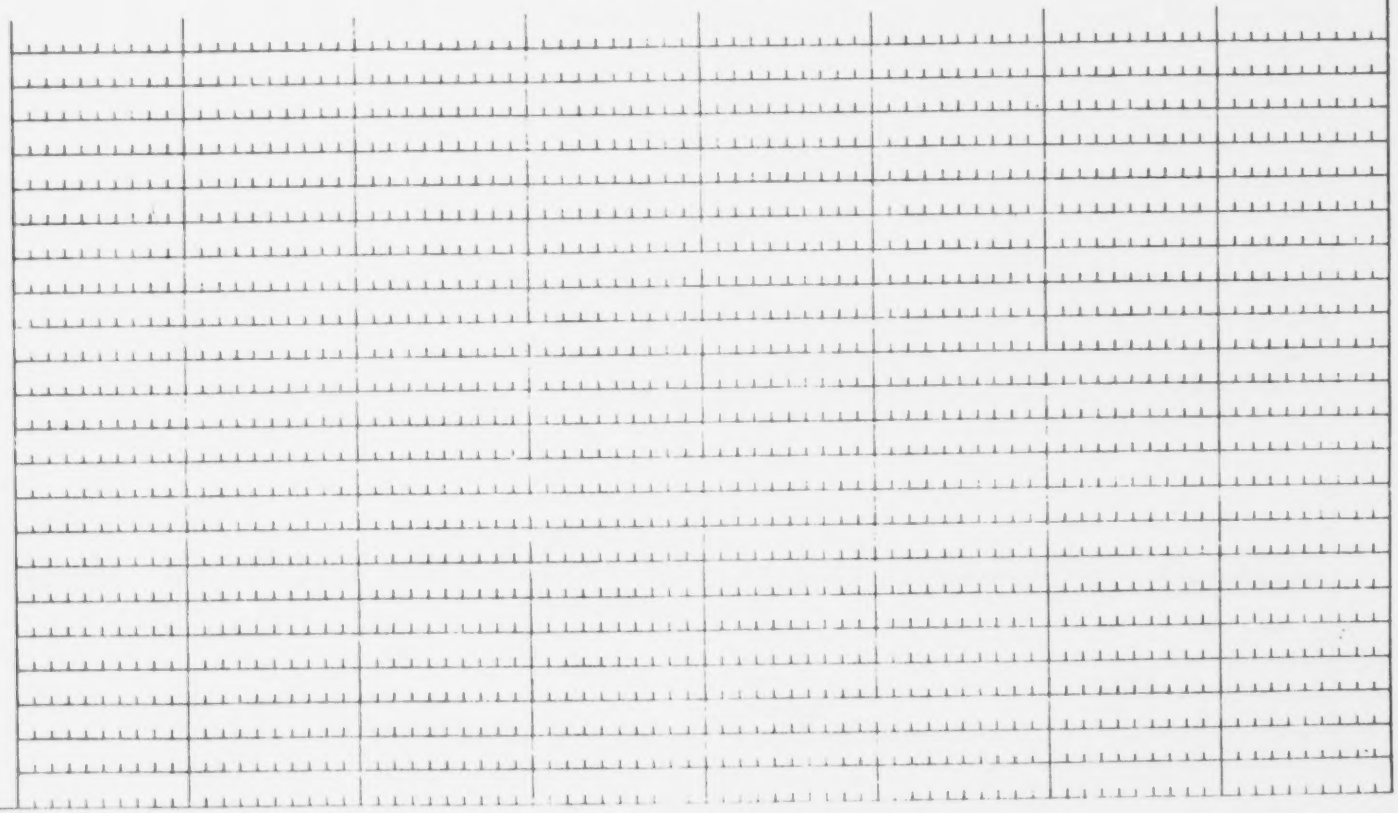
DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE

17b - - FRQ (omit if NVS = 0) -



ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP NUMBER | DATA CARD COLUMN<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 |
|---|---|
| | SOURCE DATA PARAMETER AND VALUE |
| 17c - | - GAMMA (omit if NVS = 0) - |

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

DATE SHEET OF

| CARD GROUP NUMBER | DATA CARD COLUMN<br>SOURCE PARAMETER AND VALUE |
|---|---|
| 17ca - | - DSBH (if ISW(22) = 0 or HB<0,<br>and if H ≤ HB + 0.5 * MIN(HB,1.13*BW)) - |

ISCLT INPUT DATA CODING FORM (Continued)

| PROJECT | NAME |
|---|---|
| | DATE SHEET OF |

| CARD GROUP NUMBER | DATA CARD COLUMN |
|---|---|
| | SOURCE PARAMETER AND VALUE |
| 17cb - | - DSBW (if ISW(22) = 0 or HB<0 , and if H ≤ HB + 0.5 * MIN(HB, 1.13*BW)) - |

ISCLT INPUT DATA CODING FORM (Continued)

PROJECT

NAME

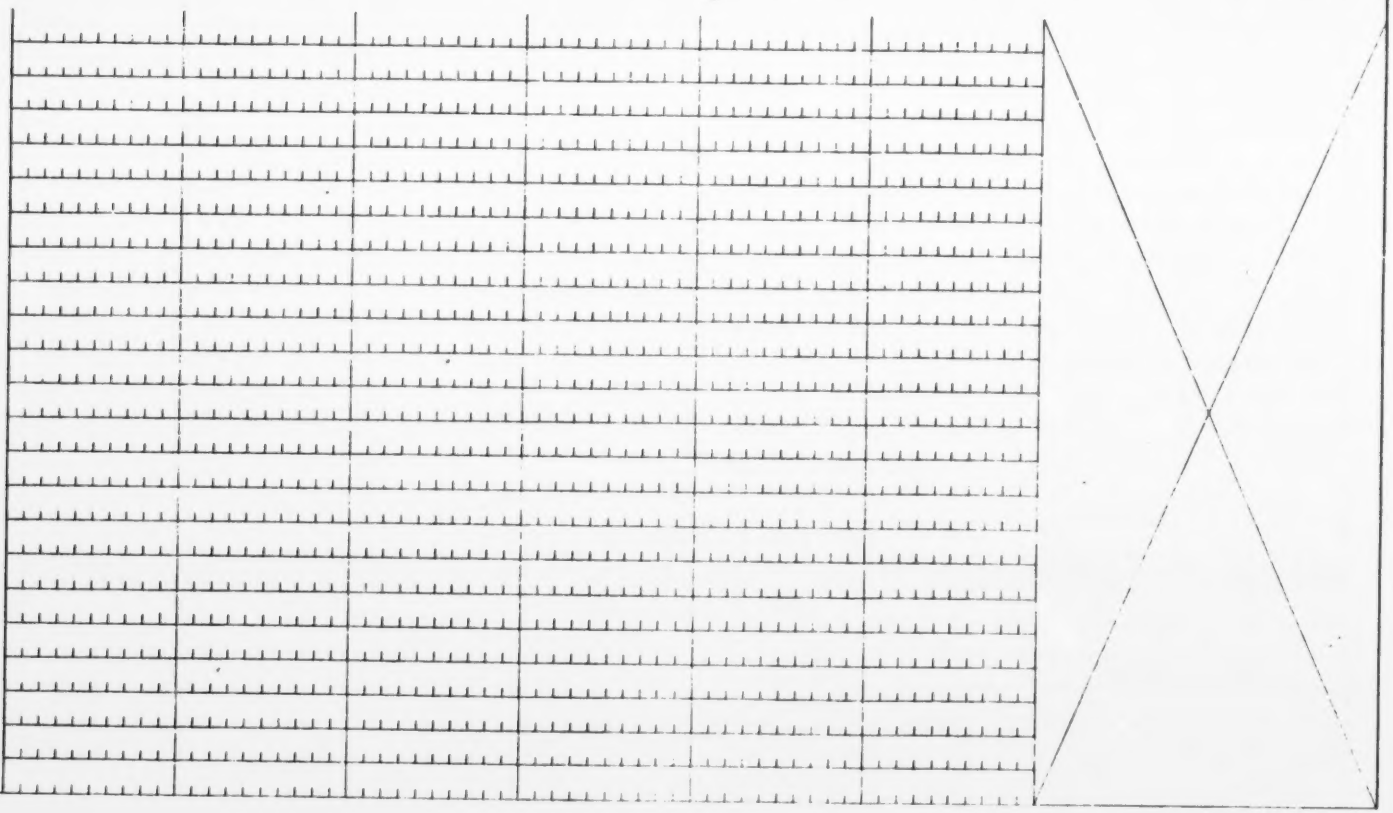
DATE SHEET OF

CARD GROUP NUMBER

DATA CARD COLUMN

SOURCE DATA PARAMETER AND VALUE ( means do not punch)

17d - Q -



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